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INCLUDING

ZOOLOGY, BOTANY, AND GEOLOGY.

(BEING A CONTINUATION OF THE 'ANNALS' COMBINED WITH LOUDON AND
CHARLESWORTH'S 'MAGAZINE OF NATURAL HISTORY.')
J

CONDUCTED BY

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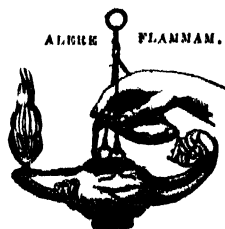
1924.

"Omnes res creatæ sunt divini sapientiæ et potentiæ testes, divitiæ felicitatis humana —ex hauti usu *bonitas* Creatoris, ex pulchritudine *sapientia* Domini, ex æconomia in conservatione, proportione, renovatione, *potentia* majestatis elucet. Earum itaque indagatio ab hominibus sibi relictis semper astimata, à vere eruditis et sapientibus semper exulta, malè doctis et barbaris semper inimica fuit"—LINNÆUS

"Quel que soit le principe de la vie animale il ne faut qu'ouvrir les yeux pour voir qu'elle est le chef-d'œuvre de la Toute puissance, et le but auquel se rapportent toutes ses opérations"—BRUCKNER, *l'horu du Système Animal*, Leyden, 1767.

. The sylvan powers
Obey our summons, from their deepest dells
The Dryads come, and throw their garlands
And odorous branches at our feet, the Nymphs
That press with mumble step the mountain-thyme
And purple heath-flower come not empty handed,
But scatter round ten thousand forms minute
Of velvet moss or lichen, torn from rock
Or rifted oak or cavern deep. the Naiads too
Quit their loved native stream, from whose smooth face
They crop the lily, and each sedge and rush
That drinks the rippling tide the frozen poles,
Where peril waits the bold adventurer's tread,
The burning sands of Borneo and Cayenne,
All, all to us unlock their secret stores
And pay their cheerful tribute.

J. TAYLOR, *Norwich*, 1818.



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THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

"..... per litora spargite muscum,
 Naiades, et circum vitreos considite fontes:
 Pollucæ virgineo teneros hinc carpitis flores.
 Floribus et pictum divæ replete canistrum.
 At vos, o Nymphæ Craterides, ite sub undas,
 Itæ, recurvato variata corallia trunco
 Vellite muscosis e rupibus, et mihi conchas
 Ferte, Deæ pelagi, et pingui conchylia sacco."
N. Partheni Giannettusi, Eol. 1

No. 73. JANUARY 1924.

I.—*A Revision of the Old World Cyrtacanthacrinini (Orthoptera, Acrididæ).*—IV. *Genera Austracris to Cyrtacanthacris* *. By B. P. UVAROV, F.E.S., Assistant Entomologist, Imperial Bureau of Entomology.

XVIII. Genus AUSTRACRIS, nov.

Agrees in all important characters with the genus *Patanga*, but differs substantially in the shape of the prosternal spine, which is strongly bent backwards and inflated before the apex; the latter is pointed and touching the mesosternum, or nearly so. This genus is yet imperfectly known, as it is confined to Australia and Oceania, and the Orthopterous fauna of those countries is far from being explored. The latest revision of Australian Acrididæ by Sjöstedt did not throw much light on the systematics of the genus, as this author based his conception of species mostly on colour-characters and mixed together similarly coloured but morphologically distinct species; besides this, he paid no

* Part I., *Ann. & Mag. Nat. Hist.* (9) xi, p. 130 (1923); Part II., *ibid.* p. 473; Part III., *ibid.* xii, p. 345 (1923).

attention to geographical races, in spite of the fact that almost all species of the genus are obviously variable in connection with local conditions and each may be split into several well-marked subspecies.

Key to the Species.

- | | |
|---|------------------------------|
| <p>1 (2). Frontal ridge with only a short impression beneath the ocellum, thinly and sparsely punctured. Male cerci equally broad throughout, with the apex suddenly narrowed and rectangularly bent downwards. A more slender species, with the pronotum distinctly selliform, constricted in the prozona. (Australia, Oceania.)</p> | 1. <i>guttulosa</i> (Walk.). |
| <p>2 (1). Frontal ridge below the ocellum impressed and coarsely punctured. Male cerci strongly, but gradually narrowed towards the apex which is somewhat bent downwards and inwards. More heavily built species with the pronotum almost cylindrical, or even slightly tectiform in the prozona.</p> | |
| <p>3 (4). Smaller. Median keel of pronotum very low. Elytra with numerous small brownish spots, often indistinct. Hind femora without or with but faint dark fasciae. Wings yellowish or hyaline. (Australia.)</p> | 2. <i>proxima</i> (Walk.). |
| <p>4 (3). Larger. Median keel of pronotum distinctly raised. Elytra with a few large black spots. Hind femora distinctly fasciated. Wings bluish. (Australia.)</p> | 3. <i>basalis</i> (Walk.). |

1. *Austracris guttulosa* (Walk.).

As this species has been redescribed several times under different names, some of which should now be used only for subspecies, and some as mere synonyms, I give the synonymy under the corresponding subspecies.

Key to the Subspecies.

- 1 (6). More or less unicolorous, brownish, without or with but an indistinct pale median stripe on the head and pronotum; the pale stripes in the marginal and anal fields of elytra also wanting or indistinct.
- 2 (3). Pronotum anteriorly narrowed, but not constricted. General coloration pale brownish, almost uniform. Lateral lobes of the pronotum with the lower dark submarginal fascia indistinct or

obsolete. Elytra with the dark spots more or less (in the type almost completely) obsolete. Dimensions: ♂, body 40-43, elytra 38-42; ♀, body 48, elytra 52 mm. (New Hebrides, N. Caledonia, Fiji.)

1 *a. illepada* (Walk.).

3 (2). Pronotum distinctly constricted anteriorly.

4 (5). Larger (♂, body 50, elytra 48; ♀, body 60, elytra 58 mm.) and of more robust build. Coloration somewhat reddish brown. The sides of the pronotum distinctly paler than its disc, with the lower dark submarginal and pale marginal fasciæ well defined. (N. & N.W. Coast of Australia; Cocos Islands.)

1 *b. guttulosa* (Walk.).

5 (4). Smaller (♂, body 34-38, elytra 33-34; ♀, body 42, elytra 43 mm.) and more slender. Coloration dark brown. The sides of the pronotum scarcely paler than its disc, with the pattern obsolete. (Tongatabu; Friendly Islands.)

1 *c. nana*, subsp. n.

6 (1). General coloration very pale, with the median fascia on the head and pronotum, as well as the stripes in the marginal and anal fields of elytra very distinct, ivory-white. The spots on the elytra, as a rule, numerous, sharply defined, shining black. ♂ (type), body 43, pronotum 7.5, elytra 40; ♀ (paratype), body 50, pronotum 9.5, elytra 48 mm. (The interior of Australia.)

1 *d. gracilis*, subsp. n.

1 *a. Austracris guttulosa illepada* (Walk.).

**1870. *Cyrtacanthacris parvula*, Walker, Cat. iii. p. 567. no. 36 (nom. præocc., see Walker, l. c. p. 554. no. 9).

**1870. *Cyrtacanthacris illepada*, Walker, l. c. iv. p. 615 (a new name for *C. parvula*).

**1907. *Acridium neo-caledonicum*, Finot, l. c. p. 291 (ad partim!).

The insect redescribed under the name of *Acridium illepidum* by Sjöstedt belongs undoubtedly to the race *guttulosa*, Walk., while under that latter name the same author described a quite distinct subspecies, named by me *gracilis*, subsp. n. (see below, under corresponding subspecies).

Geographical distribution. Aneiteum, New Hebrides* (B.M.; type and 8 paratypes of Walker); Matuku Island (B.M.); Natova, Fiji (B.M.); Nouvelle Calédonie (P.M.; Finot's type of *A. neo-caledonicum*); Houadou R., New Calédonie (B.M.); Fidschi (Ebner coll.); Neu Hebriden (Ebner coll.).

* Not "North Hebrides" as originally given by Walker (Cat. iii. p. 567), but later on corrected by himself (l. c. iv. p. 615); Sjöstedt (l. c.) quotes the locality as "North Hebrides," which does not exist.

1 b. *Austracris guttulosa guttulosa* (Walk.).**1870. *Cyrtacanthacris guttulosa*, Walker, Cat. iii. p. 570. no. 41.**1870. *Cyrtacanthacris exacta*, Walker, l. c. p. 570. no. 42.1907. *Acridium cuspidatum*, Finot, l. c. p. 278.1921. || *Acridium illepidum*, Sjöstedt, K. Sv. Vet.-Akad. Handl. lxii. no. 3, p. 267, pl. xvii. figs. 4, 5 (nec Walker!).

Though Sjöstedt has examined the real type of *illepida*, Walk., from New Hebrides, his redescription is based not on it but on a specimen from Cape York, and it applies in all its details to the type of *guttulosa*, which is also from N. Australian coast. *A. cuspidatum*, Finot, also unquestionably belongs here.

This is the largest race of the species.

Geographical distribution. North and N.W. coast of Australia (B.M.; Walker's types of *guttulosa* and *exacta*); Keeling Island (B.M.).

1 c. *Austracris guttulosa nana*, subsp. n.

This is the smallest and most uniformly coloured of all subspecies, though one of the paratypes (from the Vavau Islands) is rather pale with the typical pattern distinct, but it may be partly due to its previous preservation in alcohol.

Geographical distribution. Tongatabu, 1 ♂ (type); Vavau, 1 ♂ (one of Walker's specimens of *exacta*); Vavau Group, Friendly Is., 1 ♂; Tongatala (? Tongatabu), 1 ♀; Samoa Isl., 1 ♀ (all in B.M.).

1 d. *Austracris guttulosa gracilis*, subsp. n.**1921. || *Acridium guttulosum*, Sjöstedt, K. Sv. Vet.-Akad. Handl. lxii. no. 3, p. 268, pl. xvi. fig. 11 (nec Walker!).

Sjöstedt's alleged redescription of *guttulosa*, Walker, is based on specimens undoubtedly different subspecifically from the true *guttulosa*, the type of which differs from *guttulosa* of Sjöstedt exactly in the characters used by that author for separating his *guttulosa* (nec Walk.) from his *illepida* (nec Walk.).

The difference between the two subspecies—*guttulosa*, Walk., and *gracilis*—consists chiefly in the colour-characters, as the size in *gracilis* is somewhat variable. Of course, as these races inhabit adjoining regions, intermediate forms between them should be expected.

Geographical distribution. Alexandria, Northern Territories of Australia, 12 ♂♂, 7 ♀♀; Cunnamulla, Queensland, 1 ♂, 1 ♀; Killalpanima, 100 miles E. of Lake Eyre,

2 ♂♂, 2 ♀♀; Tweed River, N.S. Wales, 1 ♂; Australia, 1 ♂ (all in B.M.); Noon-Kambah, N.W. Australia, 1 ♂ (S.M.).

One male from Alexandria is designated as holotype, all other specimens being paratypes.

There are, undoubtedly, also several more subspecies of *A. guttulosa*, but it does not seem to me advisable to discriminate between them with insufficient material. Examples of this species, but unnamed subspecifically have been studied from the following localities:—Hermannsburg, Central Australia (intermediate between *guttulosa* and *gracilis*); Sandy Cape; W. Australia; Asuncion; Savu, Philippines (a form close to *gracilis*; the locality very doubtful).

2. *Austracris proxima* (Walk.).

The synonymy of this species as given by Sjöstedt (*l. c.* p. 265) is correct, but the species must be split up into at least two distinct subspecies, and I think it better to give the synonyms under them.

Key to the Subspecies.

- | | |
|--|--------------------------------|
| 1 (2). Smaller. Spots on the elytra pale, indistinct. Wings hyaline. (S. Australia.) | 2 <i>a. imitatrix</i> (Walk.). |
| 2 (1). Larger. Spots on the elytra black, well defined. Wings yellowish. (N. Australia.) | 2 <i>b. proxima</i> (Walk.). |

2*a. Austracris proxima imitatrix* (Walk.).

**1870. *Cyrtacanthacris imitatrix*, Walker, Cat. iv. p. 616.

Geographical distribution. Sydney (B.M.; 1 ♂ Walker's type, 1 ♀).

2*b. Austracris proxima proxima* (Walk.).

**1870. *Cyrtacanthacris proxima*, Walker, Cat. iii. p. 571. no. 43.

**1870. *Cyrtacanthacris plagiata*, var. *γ*, Walker, Cat. iv. p. 617.

1907. *Acridium plagiatum*, Finot, *l. c.* p. 294.

1921. *Acridium proximum*, Sjöstedt, K. Sven. Vet.-Akad. Handl. lxi. no. 3, p. 265 (partim !), pl. xvi. figs. 12, 13.

1921. *Cyrtacanthacris plagiata*, Sjöstedt, *l. c.* p. 267.

As is mentioned by Sjöstedt, Walker mixed up the types of *C. plagiata* and *C. basalis*, but I have managed to find out and to fix the true holotypes of both these species. Walker described *C. plagiata* from three specimens: one female and one male from McGillivray's collection and one male (?; the abdomen is broken) without locality. The latter is obviously his specimen "c," while in the coloration

it agrees with "var. β ." The male from McGillivray's collection has the wings yellowish, which identifies it with var. γ . Thus, only the female remains, which agrees fully with the description of the typical form and must, therefore, be regarded as the holotype of *plagiata*, in spite of the fact that Walker himself later on (Cat. v., Suppl. p. 59) transferred it and the specimen *c* (var. β) to *basalis* and left under *plagiata* only var. γ , which cannot be regarded as a holotype, being described as a variety and belonging, as it does, to a species distinct from that described as the typical form. The female holotype of *plagiata* is identical with the holotype of *basalis*, and its specific name becomes, thus, a pure synonym of the latter, while *plagiata*, var. γ , is conspecific with *C. proxima*.

Sjöstedt's redescription of *proxima* only partly applies to the subspecies *proxima*, because he includes in it the next subspecies, *imitatrix*, as well, but his figures represent subsp. *proxima*.

Geographical distribution. North Australia (B.M.; 1 ♀, type of *C. proxima*, Walk.); Cape Upstart, N. Australia (B.M.; 1 ♂, type of *C. plagiata*, var. γ , Walk.)

There are several specimens at hand which belong to *P. proxima*, but cannot be identified with any of the three above subspecies, but I find it impracticable to make more new subspecies without studying series of specimens. These specimens are, as follows:—Thursday Island (B.M.); Queensland (B.M.); Paramatta (B.M.); N.S. Wales (B.M.); Yarrabah, Queensland (S.M.); Nouvelle Pomeranie (P.M.; named by Finot as *A. neocaledonicum*, but different from that species).

3. *Austracris basalis* (Walk.).

••1870. *Cyrtacanthacris basalis*, Walker, Cat. iii. p. 569. no. 40.

••1870. *Cyrtacanthacris plagiata*, Walker, l. c. iv. p. 617.

•1921. *Acridum basale*, Sjöstedt, K. Sven. Vet.-Akad. Handl. lxii. no. 3, p. 262, pl. xv. figs. 15, 16.

I am not quite sure whether this species is really distinct from *proxima*, to which it is very closely related, the male genitalia being identical, but I prefer to keep them separate in the meantime. For the reasons why *C. plagiata*, Walk., is referred to this species, see under *A. proxima proxima*.

Geographical distribution. N. and N.W. of Australia (B.M.; 1 ♀, holotype of *basalis*); Cape Upstart, N. Australia (B.M.; 1 ♀, holotype of *C. plagiata*, Walk.); no locality (B.M.; type of *C. plagiata*, var. β); Port Darwin, N. Territories (B.M.); Cape York Peninsula (S.M.; named by Sjöstedt).

XIX. Genus *NOMADACRIS*, nov.

The most conspicuous feature of this genus is the peculiar reticulation of the basal half of the elytra, which is of the same type as in the group *Coptacrae* and in some genera of the group *Acridoderi*, while, on the other hand, the reticulation of the apical half is as in *Cyrtacanthacris*, *Schistocerca*, and *Patanga*. In general appearance *Nomadacris* very much resembles both the last-named genera, but differs strongly from *Cyrtacanthacris* in the shape of the pronotum and in other characters indicated in the key.

Only one species is known at present in this genus, which is undoubtedly monotypic.

1. *Nomadacris septemfasciata* (Serv.). (Fig. 6 d.)

1839. *Acridium septemfasciatum*, Serville, Ins. Orth. p. 661. no. 20.

1862. *Acridium coangustatum*, Lucas in Maillard, Notes sur l'île Réunion, Annexe, i. p. 24, pl. xxi. fig. 3.

**1870. *Cyrtacanthacris fascifera*, Walker, Cat. iii. p. 558. no. 20.

**1870. *Cyrtacanthacris subsellata*, Walker, Cat. iii. p. 559. no. 21.

**1870. *Cyrtacanthacris purpurifera*, Walker, Cat. iii. p. 561. no. 25.

1895. *Acridium rubellum*, Finot (nec Serv.), Ann. Soc. Ent. Fr.

lxiv. p. 536 (see Finot, l. c. lxxvi. 1907, p. 303).

**1907. *Acridium sanctæ-mariæ*, Finot, l. c. pp. 306, 349.

The figures of *A. coangustatum*, Lucas, show the principal characters of *N. septemfasciata* (especially the reticulation of elytra) so distinctly that there can be no doubt as to their specific identity. The only important difference between *coangustata* and the typical South African *septemfasciata* consists in the shape of the pronotum, which in the latter is shorter and strongly constricted before the middle. There is no difference in this respect between *coangustata* and *sanctæ-mariæ* of Finot, of which I have studied the type (a male, which is considered by me as holotype), so that Finot's supposition (l. c. 1907, p. 311) as to their identity is quite correct. On the other hand, the said difference in the shape of pronotum is not likely to be due to a purely individual variation, as all the specimens from Madagascar and Mauritius seen by me belong to *coangustata*; at the same time it is not a geographical variation, as I have seen several specimens from S. and E. Africa (see below) in which the pronotum is also not as in the typical *septemfasciata*, but as in *coangustata*. Unfortunately, there are no exact records as to the circumstances under which the four African specimens above mentioned were taken, viz. from swarms or as solitary grasshoppers, though in one case (♀ from Mt. Chiriunda) there is no doubt that the specimen has not been

taken from a swarm. I venture, therefore, to suppose that *coangustata* and *septemfasciata* are but two phases*, solitary and swarming, respectively, of the same species, which should be called by Serville's name, *septemfasciata*; I should like, however, to emphasise the fact that this is only an hypothesis, and it must be checked by direct observations on the spot.

As regards other variations of the species, the general coloration and the design on the elytra may vary to a certain extent, the former probably also even in the same individual during its imaginal life, in connection with the sexual development. The characteristic oblique fasciæ on the elytra are always present, though sometimes rather pale. The rosy coloration of the base of the hind wings is also variable in its intensity, and sometimes the wings are perfectly hyaline; it is not impossible that it also changes during the individual life of an adult.

Geographical distribution. Our knowledge of the distribution of this species is still very incomplete. It seems to inhabit the whole of South Africa, reaching in the west as far north as the country on the lower Congo (Luki, Leopoldville, Kinchassa, according to I. Bolivar, in Mem. Soc. Ent. Belg. xvi. 1908, p. 112), while in the east the most northern localities known to me are:—Lake No at the junction of Bahr-el-Gazal and Bahr-el-Djebel in Sudan (B.M., 1 ♂) and Zegi Tsana, Abyssinia (B.M., 1 ♂). The species also occurs in Madagascar (B.M.; Finot's type of *sancta-mariæ* in P.M.), Mauritius (B.M.; G.M.), Réunion (Lucas, l. c.; also Bordage, Bull. Scient. Fr. et Belg. xlvii. 1914, pp. 395–396), and Moheli, Comoro Archipelago. Kirby (Cat. iii. p. 448) recorded it also from Borneo, but I do not know on what authority; there are in the British Museum three specimens labelled Bara, W. Bouru (Malay Archipelago), but it is an obvious mistake in labelling.

The solitary phase *coangustata* is known from Madagascar, Mauritius, and Réunion (whence no exact records of the swarming phase are available), and also from following localities on the African mainland:—Luki, Mayumbe on the lower Congo (Bolivar, l. c., under *Acridium sanctæ-mariæ*); valley of Muza, basin of lower Zambezi (P.M.); Luangwa valley, Northern Rhodesia (O.M.); Uganda (B.M.); Mt. Chirinda, Rhodesia (O.M.); Pretoria (B.M.). Its distribution is, thus, practically the same as that of the swarming phase, as is only to be expected.

* See my paper on the genus *Locusta* in Bull. Entom. Res., xii. 1921, p. 153; also l. c. xiv. 1923, p. 87.

XX. Genus ORNITHACRIS, nom. nov.

1923. *Glaphyra*, Uvarov, Ann. & Mag. Nat. Hist. (9) xi. p. 144.

Frontal ridge in profile in its upper part regularly convex and forming a broad bow with the fastigium; in the rest it is distinctly reclinate, straight. Face smooth. Fastigium of vertex strongly sloping, its surface feebly impressed. Distance between the eyes subequal to the horizontal diameter of an eye; height of an eye more than the height of the subocular sulcus. Pronotum distinctly compressed laterally, feebly widened posteriorly, with both hind and fore margins angulate; its surface with a coarse honey-combed sculpture; median keel arched or depressed, thick, punctured throughout or except the very middle line only.

Elytra with the basal half completely coriaceous, non-transparent, with the veinlets callous, confluent. Wings with the base coloured. Hind femora distinctly widened basally, with the upper keel of the externo-median area strongly convex and smooth. Hind tibiae with eight outer and eleven inner spines.

As the name *Glaphyra* is preoccupied, I must change it to *Ornithacris*.

The peculiar texture of the elytra and still more peculiar sculpture of the pronotum render this genus very easily recognisable. In other characters it is fairly close to *Acanthacris*, but differs from it, apart from the two above-mentioned characters, in the profile of the head, in the number of tibial spines, and in the shape of the male subgenital plate.

The genus is probably monotypic, but its only species, which is distributed all over Africa south from the Sahara, splits up into several well-marked geographical races, of which five are known to me. These races are, of course, not strictly defined, and transitional forms are to be expected, and actually exist, between the races inhabiting adjoining localities.

1. *Ornithacris cyanea* (Stoll).

1813. *Gryllus Locusta cyaneus*, Stoll, Represent. Spectr. Mant. p. 31, pl. xvc. fig. 56.

There is not the slightest doubt that Stoll's figure represents this well-known African species, though Stoll described it from 'Surinam.' Practically all writers, following Stål, called the species by Serville's name *rubellum*, which, besides being a much more recent one than that of Stoll, is hardly

applicable to this insect at all. Indeed, Serville's original description agrees better with *Nomadacris septemfasciata*, Serv., and especially with the ph. *coangustata*, Luc. (see above, p. 8); but the type of *rubellum*, which was from Ile de France (Mauritius) according to the information kindly supplied by Dr. L. Berland, is lost, and I do not feel justified in establishing the identity of the species from the description only.

Key to the Subspecies.

- 1 (6). Median keel of pronotum raised throughout, with its middle smooth; hind angle of pronotum pointed, not more than 90° .
- 2 (5). Median keel of pronotum in profile strongly convex; its lateral lobes without a pale longitudinal fascia along the upper margin.
- 3 (4). Wings violaceous. General coloration darker. Elytra with the pale fasciæ narrow, often split up into spots. (Uganda and N.E. Congo.) 1 a. *cyanea* (Stoll).
- 4 (3). Wings rose. General coloration paler. Elytra with the pale fasciæ broad. (Inner uplands of Equatorial Africa.) .. 1 b. *magnifica* (Bol.).
- 5 2). Median keel of pronotum in profile almost straight; its lateral lobes with a well-defined pale longitudinal fascia along the upper margin. Wings rose. (S. Africa.) 1 c. *pictula* (Walk.).
- 6 (1). Median keel of pronotum low, especially in metazona; its middle keel punctured except a very narrow line; hind angle of pronotum rounded, more than 90° .
- 7 (8). Pronotum more compressed laterally, with the median keel in the prozona distinctly raised. General coloration darker; lateral lobes of pronotum dark throughout (except the fore lower angle), or with a paler fascia along the upper margin, leaving the middle fairly dark; elytra with the pale fasciæ much narrower than the dark interspaces. Wings pale rose. (West African coastal zone.) 1 d. *turbida* (Walk.).
- 8 (7). Pronotum feebly compressed laterally, with the median keel very low throughout. General coloration paler; lateral lobes of pronotum pale throughout or with but a small central dark spot; elytra with the pale fasciæ not narrower (often much broader) than the dark interspaces. (Gambia, Senegal, Ashanti.) 1 e. *cavroisi* (Finot).

1 a. *Ornithacris cyanea cyanea* (Stoll). (Fig. 9 D.)

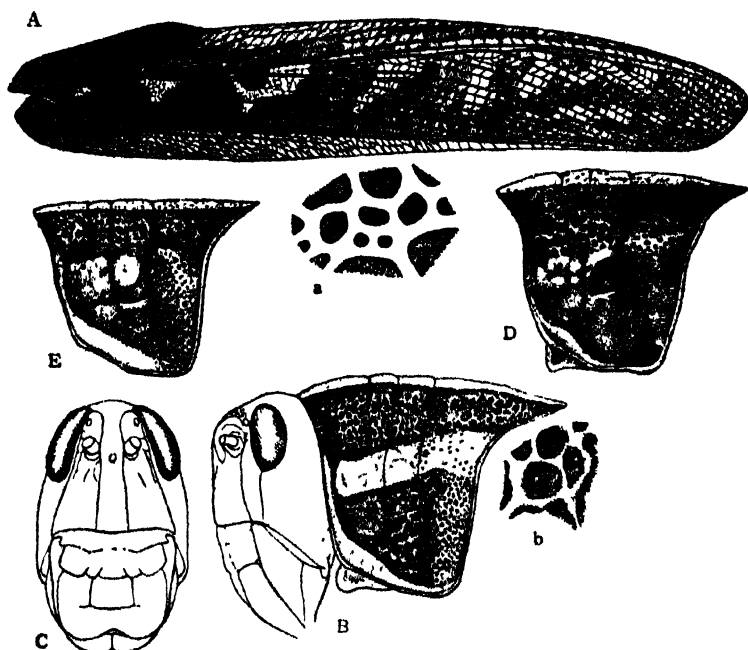
1813. *Gryllus Locusta cyaneus*, Stoll, Represent. Spectr. Mant. p. 31, pl. xv b. fig. 53.
 1889. *Acr[idium] cyaneum*, Bolivar, Jorn. Acad. Sci. Lisboa, i. p. 159. no. 144.

•1909. *Acridium magnificum*, var. *orientalis*, Sjostedt, Wiss. Ergebn. Kilim.-Meru Exped., Orth. Acrid. pp. 183, 186.

1922. *Lorusta cyanea*, Bolivar, Voyage du Baron M. Rothschild en Ethiopie, etc. p. 187, pl. x, 2, fig. 3.

Sjöstedt's description and Bolivar's coloured figure give a good idea of this subspecies, which is very closely related to *magnifica*, Bol., and differs from the latter practically in colour-characters only, as the size and also the shape of the

Fig. 9.



- A. *Ornithacris cyanea magnifica* (Bol.); a, reticulation of elytra of the same, greatly enlarged.
 B, C. *O. c. pictula* (Walk.); b, sculpture of the pronotum of the same, greatly enlarged.
 D. *O. c. cyanea* (Stoll).
 E. *O. c. oavrousi* (Fin.).

pronotum are very much alike in both races, though the median keel is somewhat more arched in *magnifica* than in *cyanea*.

Geographical distribution. The original locality whence this insect first came has been said by Stoll to be Surinam, which is, of course, incorrect. Anyhow, as no other known

subspecies has violaceous wings, I do not hesitate to restrict the name to the race inhabiting the zone of mixed forests and grass-land of Uganda and the Northern Congo, and extending also to Abyssinia (Bolivar, *l. c.*). I know the subspecies from the following localities:—Solai, Nakuru, Kenya Colony (B.M.); Entebbe, Banda and Bweya, Uganda (B.M.); Kilimandjaro (S.M.; type of *orientalis*, Sjöst.); Haut Sanga, Congo Français (P.M.).

1 *b. Ornithacris cyanea magnifica* (Bol.). (Figs. 9 A, *a.*)

**1881. *Acridium magnificum*, Bolivar, Journ. Acad. Sci. Lisboa, viii. p. 113. no. 26.

In its size, and in the shape of pronotum, which is very convex in profile, this subspecies represents the most extreme form of the species.

Geographical distribution. This race seems to be restricted to the inner plateaux of Equatorial Africa. I have seen specimens from the following localities:—Duque de Braganca (M.M.); Congo (S.M.); Tanganyika (B.M.); Uganda (B.M.); Usambara (M.M.); Nairobi (P.M.); Vallée du Muza, Zambezi (P.M.); Mt. Chirinda, Gazaland (B.M.); Mashonaland (B.M.); Salisbury, 5000 feet (O.M.); Umtali, S.E. Rhodesia, 3000 feet (O.M.); Leydsdorp, N. Transvaal (P.M.).

It is evident that this subspecies comes in contact with *cyanea* in the north-east, with *pictula* in the south, and with *turbida* in the north-west of its area of distribution, and transitional forms to all those races may be met with.

1 *c. Ornithacris cyanea pictula* (Walk.). (Figs. 9 B, *b*, C.)

**1870. *Cyrtacanthacris pictula*, Walker, Cat. iii. p. 562. no. 26.

**1870. *Cyrtacanthacris intermedia*, Walker, *l. c.* iv. p. 613 (partim!).

**1873. || *Acridium rubellum*, Stål, Rec. Ort. i. p. 62. no. 5 (nec Serv.!).
1907. || *Acridium rubellum*, Finot, *l. c.* p. 301, partim (nec Serv.!).

Serville's name *rubellum* was misinterpreted by Stål (see p. 9 of this paper), and all later authors simply followed him. Stål's type is before me now, and it is identical with *pictula*, Walk.; this latter name should therefore be adopted for this well-marked subspecies, easily recognisable by its comparatively small size and coloration. Specimens from Cape Colony are more typical than those from the Transvaal, which are larger, less strikingly coloured, and remind one of *magnifica*.

Geographical distribution. It is the South African representative of the species, known to me from the following

localities :—Lorenzo-Marquez (M.M.) ; Caffraria (S.M. ; Stål's specimen of *rubellum*) ; S. Africa (B.M. ; type of *pictula*) ; Cape Colony ; Orange River Colony ; Barberton ; Bronkhorstspuit, Transvaal (all B.M.) ; Pt. St. Johns (C.M.) ; Delagoa Bay (C.M.) ; Durban (C.M.).

1 d. *Ornithacris cyanea turbida* (Walk.).

**1870. *Cyrtacanthacris turbida*, Walk. Cat. iii. p. 556. no. 17.

**1870. *Cyrtacanthacris inclyta*, Walk. l. c. p. 558. no. 19.

This and the following subspecies differ distinctly from the three previously described by the depressed median pronotal keel, which gives them a very peculiar appearance. There is no doubt, nevertheless, that they are not different specifically, as transitional forms are also to be met with. As for the difference between this race and the next one, it is very ill-defined ; though the extreme forms are very distinct, they are connected by numerous intermediate ones—which is easily understood from their geographical distribution.

Geographical distribution. The type of *turbida* is from the Congo, without any more detailed indication of locality, but certainly from the coast, as it was brought home by Mr. A. Curron, Surgeon of the Royal Navy, as long ago as in 1843, when ships only called at ports and collectors did not penetrate far into the interior of the country.

All other specimens studied by me are also in the British Museum, from the following localities :—Fautee (type of *inclyta*, Walk.) ; Tapi and Sarkwalla, N. Territories, Gold Coast ; Entebbe, Uganda, 2 ♀ ♀. In the Madrid Museum there is one specimen from Buave, Gold Coast, so that the subspecies seems to be restricted to the coastal zone, though probably penetrating into the interior along the valleys of rivers.

1 e. *Ornithacris cyanea cavroisi* (Finot). (Fig. 9 E.)

**1907. *Acridium cavroisi*, Finot, l. c. p. 272.

**1908. *Acridium cyaneum*, var. *tereticolle*, Bolivar, Mem. Soc. Ent. Belg. xvi. p. 110. no. 109.

It is the most extreme form of the species, reminiscent in its general habitus very much of species of the genus *Patanga*, and especially of *P. succincta*, L., which is also not unlike it in the type of coloration, but, of course, is easily separated by the quite different texture of the elytra.

Geographical distribution. It is the most north-western

race of the species inhabiting the inner uplands of Gambia, Senegal, Gold Coast, and Nigeria; it probably ranges farther eastwards into the Sudan as well, but that is yet to be proved. I know the subspecies from the following localities:—Diaou-daoun près S. Louis, Senegal (P.M., type of *cavroisi*, Finot); Dakar, Senegal (P.M.); Gambia (G.M.); Calikis, Port. Guinea (B.M., type of *tereticolle*, Bol.); Ashanti (B.M.); Offa, N. Nigeria (B.M.); Yapi, Sarkwalla and Bibianaha, N. Territories, Gold Coast (B.M.). In the Paris Museum there is one specimen also from St. Vincent, Cape Verde Islands.

XXI. Genus ACANTHACRIS, nov.

This genus, based on the well-known *Gryllus ruficornis*, F., is so well defined by the shape of pronotum with its thick callous and tectiform keel, as well as by the trilobate subgenital plate of the male, that a detailed description is unnecessary.

It is not impossible that the genus is monotypic, as the second species, *A. deckeni*, Gerst., which is very imperfectly known, is possibly conspecific with *ruficornis*, and represents only a well-defined geographical race of it; in the meantime, however, I prefer to keep both the species separate.

Key to the Species.

- | | |
|---|-----------------------------|
| 1 (2). Coloration pale with definite grey and blackish pattern. (Practically whole Africa.) | 1. <i>ruficornis</i> (F.). |
| 2 (1). Coloration uniformly green. (E. Africa.) | 2. <i>deckeni</i> (Gerst.). |

1. *Acanthacris ruficornis* (F.).

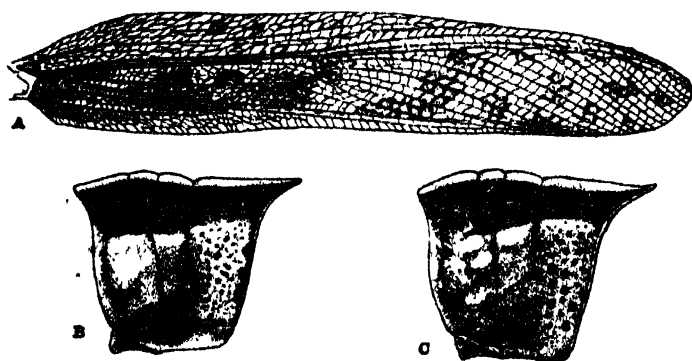
This species is widely distributed over almost the whole of Africa, except the Sahara and Egypt, and may be subdivided into several local races, of which four are known to me. As they have all been described under many different specific names, the synonymy is given under each subspecies.

Key to Subspecies.

- 1 (2). Lateral lobes of pronotum with a brown fascia along the lower margin. Hind tibiae bluish black from above and pale beneath; their spines white, with the apical third red and the point black. General coloration more or less brownish;

- elytra with several dark fasciæ and distinct spots in the apical third. Radial veins reddish. (S.W. Africa.) 1 *a. lineata* (Stoll).
 2 (1). Lateral lobes of pronotum unicolorous.
 3 (6). Elytra fasciated and spotted throughout (as in *lineata*).
 4 (5). Hind tibiæ bluish black. Median keel of pronotum ivory-white. (E. Africa.) . . . 1 *b. fulva* (Sjöst.).
 5 (4). Hind tibiæ more or less reddish. Median keel of pronotum yellowish. (W. Africa.) 1 *c. ruficornis* (F.).
 6 (3). Elytra with the apical half neither fasciated nor spotted. Tibial spines darker or, at least, not paler than the tibiæ above. (Algeria, Senegal, Abyssinia.) 1 *d. citrina* (Serv.).

Fig. 10.



- A. *Acanthacris ruficornis ruficornis* (F.).
 B. *A. r. lineata* (Stoll).
 C. *A. r. citrina* (Serv.).

1 *a. Acanthacris ruficornis lineata* (Stoll). (Fig. 10 B.)

1818. *Gryllus Locusta lineatus*, Stoll, Repres. Spectr. Phasm. p. 81, pl. xvc. fig. 57.
 1838. *Acridium ruficorne*, Burmeister, Hand. Entom. ii. p. 630. no. 9 (nec Fabr.!).
 1839. *Acridium succinctum*, Serville, Ins. Orth. p. 642. no. 1 (nec L.).
 1878. *Acridium ruficorne*, Stål, Rec. Orth. i. p. 60. no. 2 (nec F.).
 *1902. *Cyrtacanthacris pallidicornis*, Kirby, Proc. Zool. Soc. Lond. p. 99, no. 19.

Stoll's figure of *G. lineatus* has been referred by almost all authors to the same species as *hottentotum*, Stål (= *variegata*, Stoll, see under that species), but, in my opinion, it cannot be the latter species, which never has the hind tibiæ blue and the elytra obliquely fasciated as is the case in

Stoll's figure. At the same time these characters and also the shape of the pronotum of Stoll's *lineata*, which is distinctly angulate anteriorly, indicate clearly that it is the South African subspecies of *ruficornis*. The only reason against it is that the general coloration of the elytra in Stoll's figure is distinctly greenish, which is not the case in any known race of *ruficornis*, but I think this is due to inaccuracy on the part of the artist or to bad preservation of the specimen: anyhow, there is no other species of the whole group *Cyrtacanthacrinini* known which agrees with Stoll's figure better than the form to which I refer it.

C. pallidicornis, Kirby, has not been described as a distinct species, but was only a new name given by him to the form incorrectly named by Burmeister and Stål *ruficorne* (nec F.) and by Serville *succincta* (nec L.); all these authors based their descriptions on South African specimens, and *pallidicornis* becomes, therefore, a mere synonym of *lineata*. This conclusion cannot be invalidated by the fact that Kirby himself misapplied this name to the specimens from East Africa (*l. c.*), which have nothing to do with the South African form and belong to subsp. *fulva* (see below, p. 17). It must be mentioned that Kirby omitted *pallidicornis* from his Catalogue, in which he has given the synonymy of *lineata* quite correctly (except *Cyrt. concisa*, Walk., which belongs to *tatarica*, L.).

Geographical distribution. Stoll's original description was based on a specimen of unknown origin, but Burmeister, Stål, and Serville recorded this form from South Africa. The material at hand is rather too scanty to permit an exact definition of its area of distribution, but it seems to be confined to S.W. Africa, from Namaqualand to Port Elizabeth, where it meets with subsp. *fulva*. I have seen specimens from the following localities:—Rondebosch, Cape Town (O.M.); Namaqualand (B.M., long series of specimens); Cradock, Cape Colony (O.M.); Prom. Bonæ Spei (B.M.); Port Elizabeth (C.M., B.M.).

1 b. *Acanthacris ruficornis fulva* (Sjöst.).

|| *Acridium citrinum*, auct. (nec Serv., nec Finot).

**1909. *Acridium fulvum*, Sjöstedt, Wiss. Ergebn. Exped. Kilim. Meru, Orth., Acrid. pp. 184, 187, pl. vii. fig. 11.

Practically all authors who have dealt with the East African form of *ruficornis* mistook it for *nitrina*, Serv., which was originally described from Senegal and represents a quite distinct subspecies with a different area of distribution.

Kirby had evidently this particular form in his mind when he gave a new name, *pallidicornis*, which he applied to the East-African specimens, but he did not describe it and supposed it to be identical with the South African form; as that latter should be called *lineata* (see above), Kirby's name becomes a pure synonym of the latter. The only available name is, thus, *fulva* of Sjöstedt, though this author regarded it as specifically distinct from *citrina* (nec Serv.). A study of Sjöstedt's type, however, shows that it is simply an immature specimen, killed obviously just after the final moult, before it acquired the typical coloration of the pronotum; it is quite indistinguishable from the mature specimens except in the paler general coloration.

The subspecies very much resembles both the South African *lineata*, from which it differs by the unicolorous lateral lobes of the pronotum, and the West African *ruficornis*, which has differently coloured hind tibiae. This latter character is fairly reliable only when sufficiently long series of specimens are available, and intermediate forms may and do occur.

Geographical distribution. The area of distribution of this subspecies extends, so far as it is known, from Port Elizabeth, in the East of the Cape Province, through Natal and Transvaal, up to Mozambique and Uganda. I have seen it from the following localities:—Deutsch Ost-Africa, Tassamaganga (Prof. Ebner's collection); Mosambique, vall. Punguô, Quengôre (P.M.); vall. du Kedoug, Afr. Or. Angl. (P.M.); West Kilimandjaro (C.M.); Uganda: Entebbe, Kampala, Banda, Mwera, Mabira Forest (B.M.); Bukoba, Germ. E. Afr. (B.M.); Nakuru, Brit. E. Afr. (B.M.); between Lake Victoria and Tanganyika (B.M.); vall. Muza, Zambesi infer. (P.M.); Salisbury, Mashonaland (B.M.); Victoria Nyanza, N. of Ugoga (O.M.); Pretoria, Transvaal (B.M.); Fwambo, Transvaal (B.M.); Rustenburg, Transvaal (B.M.); Bloemfontein, Or. Free State (B.M.); Barkly West, Cape Province (Div. Entom., Pretoria); Knysna, Cape Prov. (O.M.); Port St. Johns, Cape Pr. (C.M.); Durban, Natal (O.M.); Baviana Krantz, Or. Free State.

1 c. *Acanthacris ruficornis ruficornis* (F.). (Fig. 10 A.)

1787. *Gryllus ruficornis*, Fabricius, Mantissa Insect. i. p. 287. no. 23 (nec Burm.; nec Serv.).

**1870. *Cyrtacanthacris decisa*, Walker, Cat. iii. p. 560. no. 22.

**1876. *Cyrtacanthacris amœnula*, Walker, l. c. p. 573. no. 46.

**1928. *Acridium gyldenstolpei*, Sjöstedt, Arkiv för Zoologi, xv. no. 6, p. 29.

This West African (probably forest) race differs from the East African one principally in the coloration of the hind tibiæ, which are in it pale sanguineous or reddish, often pale but not bluish black; in the most typical specimens the keel of the pronotum is sulphur-yellow, but this character is not constant.

Geographical distribution. Fabricius described his insect from Sierra Leone. I have studied specimens with the following data:—Camerun (G.M.; B.M.); Lagos (B.M.); Gabon, près Djolé; Cape Lopez (P.M.); Sierra Leone and Whydah, Slave Coast (B.M.; types of *decisa*, Walk.); Welle River, Congo Belge (P.M.); enclave belge de Lado (P.M.); Loanda, W. Afr. (C.M.); Kayima and Yorke, Sierra Leone (B.M.); Wassau Territory, Gold Coast (B.M.); Oban distr., S. Nigeria (B.M.); Entebbe and Mabira Forest, Uganda (B.M.); Birunga-Niederung (S.M.; described since by Sjöstedt as *A. gyldenstolpei*, but simply a transitional form to *fulva*).

1 d. *Acanthacris ruficornis citrina* (Serv.). (Fig. 10 C.)

1839. *Acridium citrinum*, Serville, Ins. Orth. p. 644. no. 3 (nec auct.!).

**1898. *Acridium ruficorne*, var. *nigripinum*, Bolivar, Actas Soc. Espan. p. 76.

**1907. *Acridium citrinum*, Finot, l. c. p. 275.

**P 1907. *Acridium ruficorne*, var. *subimmaculata*, Finot, l. c. p. 305.

As I have mentioned above (p. 16), Serville's name has been misapplied by almost all authors, except Finot, to the East African *fulva*, while it belongs to the race distributed from Algeria and Morocco into Senegal and, probably, Abyssinia.

The subspecies has very distinctly coloured elytra and hind tibiæ; the spines of the latter are distinctly longer than in other races, and there is also a marked difference in the shape of the pronotum, which is, mostly, highly crested, so that this subspecies is the most aberrant of all. I am in doubt whether Abyssinian specimens, of which I have seen only very few, should be included here, or whether they represent a distinct race, as they have the dark fasciæ on the elytra obliterate throughout (not in the apical half only, as in *citrina*) and the hind tibiæ somewhat bluish grey, with shorter spines. In case these characters prove to be constant on a long series of specimens, a north-eastern subspecies should be separated, to which the name *subimmaculata*, Fin., should be applied.

Geographical distribution. It is the most northern representative of the species, and even of the whole genus. In

the south it amalgamates with subsp. *ruficornis*, which evidently penetrates into the interior parts of West Africa along the river-valleys. Specimens from the following localities have been studied:—Marakesh, Morocco (M.M.; types of *nigrispinum*, Bol.); Morocco (G.M.); Fort Archambault, moyen Chari (P.M.); Kazablanca (P.M.); Haut Dahomey (P.M.); Kouroussa, Fr. Guinea (P.M.); Dakar, Senegal (P.M.); Casamance (P.M.); Yapi, Sarkwalla and Ashanti, N. Territories, Gold Coast (B.M.); Harrar, Abyssinia (P.M., var. *subimmaculata*, Fin.); Erythrée (P.M., type of *subimmaculata*, Fin.).

There is one specimen in Paris Museum labelled "Nouv. Caledonie," but it is obviously incorrect.

2. *Acanthacris deckeni* (Gerst.).

1869. *Acridium deckeni*, Gerstäcker, Arch. Naturgesch., xxxv. p. 219. no. 69.

1873. *Acridium deckeni*, Gerstäcker, Von der Decken, Reise in Ost-Africa, iii. (2), p. 43. no. 69, pl. iii. fig. 3.

As I have seen but a single female of this insect from Athi Plain, British East Africa (P.M.), I am not in the position to express a definite opinion on the validity of the species.

[To be concluded.]

II.—On Two Collections of Mammals: (1) from Mongalla and Bahr-el-Ghazal, (2) from Lake Tsana, Abyssinia. By P. S. KERSHAW.

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I. MONGALLA COLLECTION.

This collection was made by the Ven. Archdeacon A. Shaw for the most part at Malek on the White Nile in the Bor District of Mongalla. It includes also some specimens taken at Rejaf further south, at Yei in the Lado Enclave, and in the Vambio District in the Southern Bahr-el-Ghazal near the Congo frontier.

Forty-one species are represented, and of these two—*Herpestes nigripes* and *Dasymys shawi*—prove to be new.

Archdeacon Shaw has presented the entire collection to the British Museum, and I take this opportunity of thanking him, on behalf of the Trustees, for his valuable donation.

1. *Cercopithecus griseoviridis*, Desm.

♂. 72. Moru District, Mongalla.

De Winton, in Anderson's 'Zoology of Egypt,' sought to show that Linnæus's name *Simia æthiops* should be used for *Cercopithecus griseoviridis*. Elliot, in his 'Review of the Primates,' maintains that they are different species, citing Linnæus's words in the tenth and twelfth editions of the 'Systema'—"cauda tecta, subtus ferruginea,"—but thinks it possible that *æthiops* was a member of the genus *Cercopithecus*. I think, however, that there can be no sort of doubt that Linnæus's accounts in both editions refer to a mangabey, as the words "vertice pilis arrectis" and "palpebra superiore nuda, alba," in the tenth edition, and similar phrases in the twelfth edition, prove.

Most of the account would fit *Cercocebus lunulatus*, Temm., but there are objections:—(1) "Vertice pilis arrectis." This character is only found in the *albigena* group. The words, however, in the twelfth edition, "capillitio arrecto," might possibly be taken to indicate a brow-fringe. (2) "Supercilia frontis lunula alba transversa." This character is found in no known species of *Cercocebus*. (3) "Cauda subtus ferruginea." Too much importance should not be attached to this, as it may have been discoloration due to captivity. In the twelfth edition the words are omitted.

On the whole, it seems that we must accept one of two alternatives:—(1) that Linnæus confused the characters of a mangabey and some member of the *griseoviridis* group, or (2) that a mangabey such as he describes exists or has existed. In either case the name *æthiops* cannot be applied to any known species of *Cercocebus* or *Cercopithecus*.

It follows from this that Schreber's name *Cercocebus æthiops* for the Sierra Leone mangabey must give way to *fuliginosus*, Geoff.

2. *Galago senaariensis*, Less.

♂. 129. Rejaf District, Mongalla.

Madi name "Londeree."

3. *Taphozous sudani*, Thos.

♂. 121, 122, 123, 126. Bor District, Mongalla.

Dinka name for this and other insectivorous bats "Alik."

4. *Nycteris hispida*, Schreb.

♀. 12, 83, 84. Mulek.

5. *Lavia frons affinis*, K. And. & Wrought.

♀ . 23, 49. Malek.

6. *Rhinolophus eloquens*, K. And.

♂ . 80. Bor District.

7. *Pipistrellus marrensis*, Thos. & Hint.

♂ 120. Bor District.

This species was described by Thomas and Hinton as recently as June 1923 (P. Z. S. p. 249). The type-locality is Jebel Marra in Eastern Darfur.

8. *Eptesicus rendalli*, Thos.

♂ . 115 ; ♀ . 116, 117, 118. Malek.

9. *Chærephon pumilus*, Cretzschm.

♂ . 31, 32, 33 ; ♀ . 29, 30, 34. Malek.

10. *Atelerix albiventris*, Wagn.

♀ . 74. Moru District, Mongalla.

Moru name "Thondoro."

11. *Crocidura nyansa*, Neum.

♂ . 65. Malek.

Dinka name for this and other shrews "Yan."

12. *Crocidura turba nilotica*, Hell.

♀ . 55. Malek.

13. *Genetta stuhlmanni*, Matsch.

♂ . 76, 77 ; ♀ . 75. Moru District.

♂ . 124, 127 ; ♀ . 54. Bor District.

? Sex. A.T., Malek.

Moru name "Lamiso." Dinka name "Angon."

14. *Ichneumia albicauda ibeana*, Thos.

♂ . 71. Moru District.

♀ . 119. Bor District.

Moru name "Goromatutu." Dinka name "Wel" (when tail is white), "Loinyar" (when tail is black).

15. *Mungos gotnehi*, Fitz.

♂. 79. Rejaf District.
Bari name "O'oro."

16. *Herpestes (Calogale) nigripes*, sp. n.

♂. 70. Moru District, Mongalla, about 5° N., 31° E.
(type).

♀. 78 (juv.). Rejaf District, Mongalla.
Moru name "Goro." Bari name "Likuk."

A dark-coloured species, with greyish head and black feet.

Fur of back long and loose, about 23 mm. in length, brown speckled with buff. Darker brown speckled with white on head and neck, passing into the general colour of the back on the shoulders. Individual hairs of back seal-brown at base, then wood-brown, then seal-brown or black, with buff tips. A slight tinge of rufous round the eye, on the lips, and below the ear. Tail the same colour as back, and, in these two specimens, without a black tip. The tails are, however, probably mutilated. Under surface Prout's brown. Under surface of tail on the median line buff, becoming tawny towards the distal end. Hands and feet appear to be black by contrast, but are, in reality, a very dark brown.

Skull with no signs of upper or lower anterior premolars. Diastema reduced. Posterior molars above and below large. The parietal sutures have not coalesced except for 6 mm. posteriorly; at the centre of the brain-case they are still some 7 mm. apart.

Type. Young adult male. Original number 70. B.M. no. 23.10.14.4. Collected on 20th Dec., 1920, by the Rev. A. S. Shaw.

Hab. as above.

Dimensions of the type:—

Head and body 270 mm.; tail (perhaps mutilated) 220; hind foot 54; ear 22.

Skull: greatest length 61.5; condylo-incisive length 59.8; condylo-basal length 59; basal length 56; palatilar length 27.8; breadth of brain-case 26.3; postorbital constriction 11; least interorbital breadth 12; breadth of m^2 4; length of m_2 3.4; upper diastema 1.4; lower diastema 2.

This distinctive species, lacking (if it does so) the black tip to the tail, recalls at first sight *Helogale atkinsoni*. It is, however, a *Herpestes*. The long, almost shaggy hair and black feet also help to make it conspicuous in the subgenus *Calogale*.

17. *Lutra maculicollis nilotica*, Thos.

♂. 125. Bor District.

♀. 95. Malek.

Dinka name "Ngon."

18. *Mellivora abyssinica*, Holl.

♂. 428, 429. Malek.

Dinka name "Chirbo."

19. *Funisciurus anerythrus*, Thos.

♂. 141, 142. Bafuka, Upper Welle, Belgian Congo.

Zande name "Ngabalenguza."

20. *Tamiscus emini gazellæ*, Thos.

♂. 5. Bahr-el-Ghazal.

21. *Protoxerus stangeri centricola*, Thos.

♂. 46. Congo-Nile watershed.

There is less red about the feet and less white about the head and shoulders than is the case in the type-specimen from Entebbe. It may prove to deserve a subspecific name, but no good purpose would be served by describing the present specimen, which is a young animal.

22. *Euxerus erythropus leucoumbrinus*, Rüpp.

♀. 38. Malek.

Dinka name "Marangedengher."

23. *Euxerus erythropus lacustris*, Thos.

♂. 106. Yei, Lado Enclave.

Kakwa name "Ryangu."

24. *Graphiurus orobinus*, Wagn.

♂. 81, 430. Malek.

25. *Taterillus emini*, Thos.

♀. 107, 108. Malek.

Dinka name "Ayom Ajakayuyuir."

26. *Taterillus congicus*, Thos.

♂. 140 ; ♀. 138. Bafuka, Upper Welle, Congo.

Zande name "Sakada."

27. *Grammomys macmillani gazella*, Thos.

♂. 66. Malek.

Dinka name "Ajakayuyuir."

28. *Grammomys surdaster*, Thos. & Wrought.

♂. 43; ♀. 45. Congo-Nile watershed.

♀. 3. Southern Bahr-el-Ghazal, 3000 feet.

Zande name "Kuru."

I cannot detect any difference between these specimens and the Nyasaland form. Typical *surdaster* is known to occur all over the Tanganyika territory and in Uganda. There are one or two local forms of it in the Mount Elgon district. *Crocidura nyanse* is a species which has a similar wide range.

29. *Rattus (Mastomys) coucha ismailiæ*, Hell.

♂. 39, 48, 63; ♀. 52, 53, 62. Malek.

Dinka name "Lok."

30. *Rattus (Mastomys) coucha ugandæ*, de Wint.

♀. 41. Congo-Nile watershed.

♀. 109, 110. Yei, Lado Enclave.

Zande name "Babili." Kakwa name "Pirikubong."

31. *Leggada bella gondokoræ*, Hell.

♂. 57, 86, 100, 102, 104, 105, 112; ♀. 14, 101. Malek.

Dinka name "Gwet" or "Gwegwet."

32. *Lophuromys ansorgei*, de Wint.

♂. 134; ♀. 135. Yambio District, Bahr-el-Ghazal.

Zande name "Ndogo."

33. *Acomys wilsoni argillaceus*, Hint. & Kersh.

♀. 59. Malek.

Dinka name "Gwet" or "Gwegwet."

According to Archdeacon Shaw, the natives think that the pygmy mouse (*Leggada*) is a young spiny mouse, and that the spiny mouse finally becomes a hedgehog!

34. *Dasymys orthos*, Hell.

♂. 22. Malek.

35. *Dasymys shawi*, sp. n.

♂. 25. Mount Baginzi, Southern Bahr-el-Ghazal, near the Congo State border, 40 miles S.S.E. of Yambio (type).

♂. 133. Yambio District.

Zande name "Barasugba."

A small species, with an evenly rounded antorbital plate.

In size and colour very similar to *D. medius*. Colour of back mummy-brown, darkened by the black-tipped hairs. Lower surface grey, very slightly tinged with cream-buff. Sides of body and face greyer than in *medius*. Hands and feet pale brown. Tail dark brown above, paler below.

Skull with antorbital plate very nearly evenly rounded above. In this it resembles *orthos*, but the anterior region is not straight as in that species, but concave, the whole forming a somewhat elongated S.

Dimensions of the type (taken from the dried skin) :—

Head and body 152 mm.; tail 144; hind foot 29; ear 19.

Skull: greatest length 34·8; condylo-incisive length 34·6; basilar length 30; zygomatic breadth 18; palatal foramina 7·5; nasals 12·5; least breadth of antorbital plate 4·6.

Type. Adult male. B.M. no. 17. 10. 4. 27. Original number 25. Collected by Dr. C. Christy in March 1916. Another collected by Archdeacon Shaw (no. 133 above).

Hab. (as above).

D. shawi is, perhaps, most nearly related to *orthos*, but is a smaller species, and differs besides in colour and in the skull-characters mentioned above.

36. *Arvicanthis abyssinicus rubescens*, Wrought.

♂. 20, 21, 25, 36, 99, 103, 111; ♀. 24, 26. Malek.

Dinka name "Anyor."

37. *Arvicanthis abyssinicus centralis*, Dollm.

♀. 130, 131, 132. Yambio District, Bahr-el-Ghazal.

Zande name "Gua."

38. *Lemniscomys zebra*, Heugl.

♂. 56, 58, 60, 82; ♀. 50, 51, 61. Malek.

♀. 42. Congo-Nile watershed.

Dinka name "Nyangdor." Zande name "Sika."

39. *Lepus microtis*, Heugl.

♀. 113, 114. Bor District.

Dinka name "Nyanchinbiol."

Heuglin's specimen, which was a very young one, was collected on the wooded plains of the Rej tribe, between 6°-8° N. and 29°-31° E. The Bor District adjoins this area, so that Archdeacon Shaw's specimens are practically topotypes.

As these are full-grown, and as the species, on account of the extreme youth of the type, has been hitherto somewhat of a puzzle to mammalogists, a brief description of the adult form, which will not, I think, be found inconsistent with Heuglin's account, and a comparison with other species, will not be out of place.

It is a large short-eared form, with much ochraceous-buff colour in the pelage. But what chiefly distinguishes it from other hares is the short crisp fur of the upper parts. These are buff regularly sprinkled with black. Throat, nape, fore legs, and outside of hind legs ochraceous buff. Underparts from throat to tail white, with a broad buff streak on either side. Top of head dark brown; much greyish and yellowish white about eyes and cheeks. Tail black above, white below.

Skull large, with noticeably broad nasals and heavy dentition.

The respective measurements of the two specimens are as follows:—

Head and body 411, 413 mm.; tail 88, 88; hind foot 98, 97; ear from notch 92, 95.

Skull: total length 87, 90; zygomatic breadth 39, 40·3; interorbital breadth 21, 21; nasals 38·2 × 22, 39 × 25.

This hare, with its large broad skull and peculiar pelage, appears to have no near affinities with other African hares. The small, pale, long-eared *hawkeri* from Kaka on the White Nile, at 10° 30' N., is a very different animal. *L. cordeauai*, from Sheikh Mohamed in Abyssinia, and, apparently, *L. victorise kakumega* resemble it superficially in colour only. But even here there are important differences in detail.

Archdeacon Shaw is to be congratulated on having re-established this interesting species.

40. *Procavia slatini*, Sassi.

♂. 68; ♀. 69. Moru District.

These two specimens, which were taken together, differ somewhat in colour from one another. Nor does either of them agree well with Sassi's account. I have ventured, however, for geographical reasons and on account of their very dark speckled heads, to assign them to *slatini*.

Moru name "Kira."

41. *Procavia (Heterohyrax) brucei*, Gray.

♀. 128. Opari District, Mongalla.

♂. 8. Malek. (Skull only.)

Madi name "Okile."

II. LAKE TSANA COLLECTION.

This small collection of sixteen species, made by Dr. John P. Mitchell, the Medical Officer attached to the Tsana Mission, in the vicinity of Lake Tsana in Abyssinia, is of much interest. Zoological specimens are very seldom received from this area, so that Dr. Mitchell's generous gift of the collection to the British Museum is greatly appreciated.

The example of Heuglin's variety of the Gelada baboon, not hitherto represented in the British Museum, is a most welcome addition. Its occurrence at Ubbo extends the range of this interesting species fully 100 miles to the north-west.

Bahr dar Giorgis is at the extreme south of the lake, where the Blue Nile leaves it. The island of Debra Mariam is close by, while Zeghi is on the point, 7 miles north-west of Bahr dar Giorgis.

1. *Theropithecus obscurus*, Hengl.

♂. B.M. no. 21. 11. 25. 1. Ubbo, 20 miles N.E. of Lake Tsana.

The colour agrees well with the original description, except that the tail seems to be lighter in colour, there being little trace of brown in it.

2. *Epomophorus anurus*, Heugl.

♂. 46; ♀. 45. Bahr dar Giorgis (in alcohol).

3. *Nycteris revouli*, Robin.

♂. 54; ♀. 53. Bahr dar Giorgis (in alcohol).

4. *Rhinolophus fumigatus*, Rüpp.

♂. 3; ♀. 2. Bahr dar Giorgis.

Native name "Yaelatewof."

5. *Felis serval phillipsi*, Allen.

♂. 47. Bahr dar Giorgis.

♂. 8. Bahr dar Giorgis. (Skull only.)

The ground-colour of this skin is lighter even than as

described by G. M. Allen, being cream-buff, except on the median dorsal line, where it is buff. The specimen is not fully adult.

Native name "Aner."

6. *Genetta abyssinica*, Rüpp.

♂ . 57 ; ♀ . 60. Bahr dar Giorgis.

7. *Atilax paludinosus mitis*, Thos.

♀ . 58. Zeghi. (Topotype.)

Native name "Mochachilla."

8. *Herpestes ichneumon*, Linn.

♀ . 20. Bahr dar Giorgis.

♀ . 6. Debra Mariam Island, Lake Tsana.

9. *Herpestes (Calogale) mutzigella*, Rüpp.

♂ . 61 ; ♀ . 62. Bahr dar Giorgis.

♀ . 26. Zeghi.

Native name "Mochachilla."

10. *Canis variegatus*, Cretzschm.

♂ . 7. Bahr dar Giorgis.

Native name "Kabarro."

11. *Aonyx capensis meneliki*, Thos.

♀ . 25 ; ? sex. 50. Bahr dar Giorgis.

Native name "Akostu."

12. *Ictonyx striatus shoa*, Thos.

♂ . 44 ; ♀ . 1. Bahr dar Giorgis.

♀ . 30. Zeghi.

Native name "Faro."

13. *Heliosciurus multicolor*, Rüpp.

♀ . 22. Bahr dar Giorgis.

♂ . 14. ; ♀ . 12, 13, 15, 16. Zeghi.

Native name "Fohlt."

14. *Rattus* sp.

♂. 59. Bahr dar Giorgis (in alcohol).
Apparently a multimammate. Possibly *R. coucha lateralis*,
Heugl.
Native name "Ait."

15. *Leggada bella* subsp.

♂. 49. Bahr dar Giorgis (in alcohol).
In colour it most resembles *L. b. vicina*, the Mombasa
form.

16. *Procuria (Heterohyrax) brucei*, Gray.

♂. 9; ♀. 10, 11, 18, 19. Zeghi.
Native name "Isikwokwo."

III.—On the Specific Distinctions of *Haliplus obliquus*, F.,
and *Haliplus confinis*, Steph. By E. J. PEARCE, F.E.S.

(From the Zoological Laboratory, Cambridge.)

I HAVE in myself until recently, and also in others whose specimens I have named, noticed a tendency to confuse these two really easily separable but closely allied species. It seems, therefore, worth while to put on record four, I think, new characters for their separation, which seem to me more easily and readily appreciated than those hitherto given publicity. The raising of *Haliplus pallens*, Fow., to specific rank has not simplified the discrimination of *confinis* and *obliquus*, though *pallens* is a very rare species as yet, and consequently nearly always absent from British collections. Unfortunately, owing, I believe, to all the known specimens of this species taken in this country being old and scarce, I have not yet been able to obtain any for dissection and comparison with its nearest relatives, *obliquus* and *confinis*; however, I hope I will be able to do so. But I notice that Zimmermann (4*) does not give *pallens* specific rank, though he had evidently seen Edwards's paper (2).

Both *obliquus* and *confinis*, unlike *pallens*, are widely distributed in Great Britain, and, as far as the records go, in Ireland also, though I have only seen a few specimens from that country. Both these species, apart from their local

* See Bibliography at end of paper.

associations, seem to occur (at any rate, in England) almost exclusively in pools and slowly-running water where there is what I may call a high carbonate percentage, for want of a better term; with this goes an almost invariable occurrence of such algæ as *Chara* and *Nitella*, which, by placing in weak acid, can be shown to owe their rigidity mainly to deposit of lime. I have taken *Haliplus* larvæ, as well as adults of *confinis*, in dew-ponds in West Sussex, where there occurs a growth of one or other of these algæ. The larvæ fed voraciously on the algæ.

The character given usually, as far as I have been able to find, for the separation of *confinis* from *obliquus*, is the presence, on either side at the base of the thorax, opposite the fourth row of elytral punctures, of a longitudinal impression bounded outwardly by a distinct ridge (2, p. 3). The punctuation and emargination of the prosternum are also mentioned, but I think it is better to regard this rather as a subsidiary character, along with others such as the shape of the mandibles and form of the coxal plates. Perhaps no. 3 of my new characters may eventually have to be included with these. With regard to the thoracic impression of *confinis*, possibly many coleopterists will admit that it requires very often most careful manipulation to appreciate the position or even presence of depressions on parts of an insect's body, owing to difficulties of lighting etc., specially when they occur near a patch of darkly pigmented chitin, and especially when other scattered punctures are present in addition, as they are here. I also have specimens of *obliquus* which exhibit a tendency to depression of the base of the thorax, quite distinct in some of the specimens I received recently from Ulm, Germany, which undoubtedly belong to this species.

In addition to this and the other subsidiary characters, I propose the following, in that they are more readily appreciable:—

- | | | |
|------|--|------------------|
| A. { | 1. (Text-fig. 1.) Elytra jutting out from base of sides of thorax, and so forming a very distinct angle . | <i>obliquus.</i> |
| | Elytra practically continuous with sides of thorax, only a very obtuse angle being formed | <i>confinis.</i> |
| | 2. Basal third of sides of elytra almost straight and parallel from behind angle with side of thorax, then rather sharply narrowed to apex | <i>obliquus.</i> |
| | Basal two-thirds of elytra almost continuously rounded, then narrowed to apex | <i>confinis.</i> |
| | 3. Coxal plates with large, flat, round depressions in addition to a fine and thick punctuation | <i>obliquus.</i> |
| | Coxal plates finely punctured all over, without larger depressions | <i>confinis.</i> |

This last character is the only one which I have found to be the least susceptible of variation, after having examined many specimens of both species from widely separated localities.

- ♂♂. { 4. (Text-fig. 2.) The form of the ædeagus in the two species is remarkably different. In *obliquus* the accessory lobes are somewhat triangular, in *confinis* they are narrower and thinner. The ædeagus itself is peculiar in *confinis*; from the base it is bent somewhat after the manner of the same organ in *H. immaculatus*, Gerh. At the apex it is hooked in a remarkable manner—i. e., is almost axe-shaped. This is difficult to describe, but may easily be appreciated in the drawing. The apex of the ædeagus of *obliquus* is also slightly bent down, and is roundly truncate.

As to variation of colour-pattern and size, in *confinis* I find that it is quite marked, though Edwards (2) had not found any in this species when he wrote his paper, which undoubtedly marks the starting-point in the accurate investigation of our British Haliphidæ.

My greatest range in length in *confinis* is from 4.3 mm. (Cambridge and East Suffolk specimens) down to 3.0 mm. (Hebrides and West Sussex specimens). In colour I have found a general tendency for the Hebrides (Islay and Jura) specimens to be dark, with obscuration of the lateral lighter patches on the elytra. This is most marked in a small ♀ *confinis* taken by my friend Mr. G. E. Hutchinson, on Gigha in late June 1922. This—unfortunately a single specimen—is completely melanic as to its elytra, no traces of any lighter lateral patches and no yellow whatever between the elytral striæ being present. My lightest *confinis* come from Dorset and the south of England generally, and, though I may be open to correction, I do not think the specimens may be put down as immature, as several were kept alive some weeks after capture, and no further darkening occurred. *Haliphus obliquus*, as Mr. Edwards states, varies considerably, some of my Hebrides specimens being darker than is usual, with great exaggeration of the black marking on the elytra. Two specimens I have before me from the Isle of Man are rather small and light-coloured for this species.

The sexes are very similar in these two species, but there is a general tendency for the elytra of the ♀♀ to be more punctured than those of the ♂♂, which are slightly narrower than the ♀♀ and have the usual ♂ tarsal characteristics.

In conclusion, I should like to say I should be very grateful for any specimens of *pallens*, especially British ones

(presumably from Loch Loven), that may be used for dissection. It is to be hoped that in due course our other Haliplids will become better studied, now the way has been paved by Mr. Edwards (2) and by Mr. Balfour-Browne (1), who confined himself to the "*ruficollis*" group. The biology of the Haliplidæ is extremely interesting, as has been shown by Matheson (3) in America.

BIBLIOGRAPHY.

- (1) F. BALFOUR-BROWNE. "On the British Species of *Haliphus*, Latreille, related to *Haliphus ruficollis*, De Geer, with some Remarks upon *H. fulvicollis*, Erichson, and *H. furcatus*, Seidlitz." *Ann. & Mag. Nat. Hist.* ser. 8, vol. xv., Jan. 1915, p. 109, fig. 2.
- (2) J. EDWARDS. "A Revision of the British Species of *Haliphus*, Latreille." *Ent. Month. Mag.* 2nd ser. vol. xxi. pp. 3, 5 6.
- (3) R. MATHESON. "The Haliplidæ of North America, North of Mexico." *Journ. N. Y. Ent. Soc.* vol. xx., Sept. 1912, pp. 188-190.
- (4) A. ZIMMERMANN. *Catalogus Coleopterorum*, pars 71 (Haliplidæ), p. 304.

IV. — *New or little-known Tipulidæ (Diptera).* — XIX.
Australasian Species. By CHARLES P. ALEXANDER, Ph.D.,
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 Massachusetts, U.S.A.

THE species of crane-flies described in the present paper are from various Pacific Islands. The important collection from Fiji was sent by Messrs. Greenwood and Veitch to the Imperial Bureau of Entomology, and thence to the writer through Dr. Marshall and Mr. Edwards. Collections from the Solomons were sent from the Bishop Museum and the Museum of Comparative Zoology, Cambridge, Massachusetts. Other islands included are the Hawaiian Islands, Austral Islands, New Britain, and New Hebrides. For the interesting material from New Britain, I am indebted to Mr. Gerald F. Hill. The *Epiphragma* from New Hebrides was included in large and important series of crane-flies in the Paris Museum kindly sent to me by Mons. Ségué.

Doaneomyia fijiensis, sp. n.

Female.—Length about 4.8 mm. ; wing 6.5 mm.

Generally similar to *D. tahitiensis*, Alexander, differing as follows:—

Head scarcely darker brown than the mesonotum. The
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white tibial bases are twice as extensive as those of *D. tahitiensis*, being fully two-thirds the white apex; the total amount of white on the tibiae thus exceeds the brown central portion; the dark basal ring on metatarsi almost black. Wings with the basal petiole even longer and more slender than in *D. tahitiensis*. Sc_2 is retreated back from the tip of Sc_1 for a considerable distance, Sc_1 alone being longer than the stigma; petiole of cell M_2 shorter and cell 2nd A narrower than in *D. tahitiensis*. Abdomen almost uniformly dark brown, the sternites a little paler.

Hab. Fiji.

Holotype, ♀, Mountains, Laütoka, April 11, 1920 (*W. Greenwood*).

Type in the collection of the British Museum (Natural History).

Dicranomyia (Thrypticomys) subsaltens, sp. n.

Male.—Length about 5 mm.; wing 6.5 mm.

Female.—Length 5.5 mm.; wing 6.4 mm.

Generally similar to *D. (T.) apicalis* (Wiedemann), differing as follows:—

Size larger (wing over 6 mm.). Wings almost uniformly tinged with pale brown, the stigma elongate, darker brown. Venation: Sc_1 ending opposite the origin of Rs , Sc_2 far removed from the tip of Sc_1 , so that the latter vein alone is about two-thirds the length of Rs ; inner end of cell 1st M_2 rather squarely truncated, lying distad of the inner end of cell R_3 ; basal deflection of Cu_1 at or before mid-length of cell 1st M_2 . Metatarsi with about the basal third darkened.

Hab. Fiji.

Holotype, ♂, Laütoka, April 22, 1922 (*W. Greenwood*).

Allotopotype, ♀, June 12, 1922 (*R. Veitch*).

Paratopotype, ♂, with the type; *paratypes*, ♂, Nadi, July 27, 1913 (*J. F. Illingworth*), in author's collection; ♂, Walu Bay, Suva, June 1922 (*D. Stoner*), in collection of University of Iowa.

Type in the collection of the British Museum (Natural History).

This is the species formerly determined by the writer (*Ann. Ent. Soc. Amer.*, 7: 239; 1914) as being *Dicranomyia saltens* (Dolechall). It has since been shown, however, that the latter species is a *Euglochina*, whereas *D. apicalis* (Wiedemann) is a *Thrypticomys* and is the earliest-described species of the subgenus. A comparison with the type of

D. apicalis has shown the Fijian species to be amply distinct, easily recognized by the larger size and almost uniformly darkened wings, with vein Sc_1 very long.

Dicranomyia bryani, sp. n.

General coloration dark chestnut-brown, the præscutum with a broad median stripe and broad lateral margins of brown; wings conspicuously clouded with brown; abdominal segments indistinctly bicolorous.

Male.—Length about 6 mm.; wing 8.4 mm.

Rostrum and palpi black. Antennæ brownish black throughout. Head dark brown.

Mesonotal præscutum dark chestnut-brown with a conspicuous brownish-black median stripe that does not reach the suture; lateral margins of sclerite brownish black, the usual interspaces thus being very broad; scutal lobes dark brown, the median area narrowly paler; scutellum obscure yellow; postnotum brownish black, the anterior two-thirds slightly pruinose. Pleura brown with an indistinct blackish longitudinal stripe extending from the cervical sclerites to the postnotum. Halteres pale brown, the base of the stem and the apices of the knobs conspicuously pale yellow. Legs with the coxæ brown, the posterior coxæ paler; trochanters brownish testaceous; femora dark brown, the bases and apices a little paler; tibiæ and tarsi dark brown. Wings faintly darkened, distinctly clouded with brown; stigma oval, brown; very broad pale brown seams at origin of R_s , along the cord and on the outer end of cell 1st M_2 ; cell Sc and a suffusion across the bases of cells R , M , Cu , and the *Anal*s paler brown; veins dark brown. Venation: Sc short, Sc_1 ending a short distance beyond the origin of R_s , Sc_2 immediately opposite this origin; cell 1st M_2 about as long as vein M_{1+2} beyond it; basal deflection of Cu_1 just before the fork of M .

Abdominal segments dark brown, the caudal margins of the sclerites narrowly but distinctly margined with paler; basal sternites more extensively pale.

Hab. Hawaiian Islands.

Holotype, ♂, 29 mi. Olaa, Hawaii, July 22 (*W. M. Giffard*).

Type in the collection of the Bishop Museum, Honolulu.

This very distinct species is named in honour of Mr. Edwin H. Bryan, Jr., to whom I am greatly indebted for the privilege of studying important collections of Hawaiian Tipulidæ.

Dicranomyia rapæ, sp. n.

General coloration dark brown, the præscutum with a still darker brown median stripe; wings faintly tinged with brown; stigma and spots at origin of *Rs* and at arculus darker brown; *Sc* short, *Sc*₁ ending just beyond the origin of *Rs*.

Female.—Length about 7 mm.; wing 7·5 mm.

Rostrum and palpi dark brown. Antennæ dark brown, the terminal segments broken. Head dark grey.

Mesonotum dark brown, the præscutum with a darker brown median stripe; scutal lobes dark brown, the median area narrowly grey; scutellum light grey; postnotum light grey, the lateral sclerites a little darker. Pleura dark brown, sparsely pruinose. Halteres with the bases obscure yellow, the knobs broken. Legs with the coxæ and trochanters light brown; femora pale brown, the tips narrowly and rather indistinctly blackened; remainder of legs obscure yellow, the terminal tarsal segments infuscated. Wings with a faint brownish tinge; stigma subcircular, dark brown; brown clouds at arculus and at origin of *Rs*, the latter also including the tip of vein *Sc*; less distinct brown clouds along the cord; veins dark brown. Venation: *Sc* ending immediately beyond the origin of *Rs*, *Sc*₂ close to its tip; *Rs* a little less than twice the basal deflection of *R*₄₊₅; basal deflection of *Cu*₁ just before the fork of *M*.

Abdomen dark brown. Ovipositor with the tergal valves moderately elongate, almost straight.

Hab. Austral (Tubuai) Islands.

Holotype, ♀, Rapa, November 1921, at light (*Mrs. A. M. Stokes*).

Paratopotypes, 2 broken specimens.

Type in the collection of the Bishop Museum, Honolulu.

Dicranomyia fijiana, sp. n.

Wings subhyaline, with a series of small brown clouds in cells *R*₁, *R*₃, *R*₅, 2nd *M*₂, *M*₃, *Cu*, *Cu*₁, and 1st *A*; vein *Sc* short, *Sc*₂ at the tip of *Sc*₁; cell 1st *M*₂ closed; basal deflection of *Cu*₁ at the fork of *M*.

Male.—Length 5 mm.; wing 6·4 mm.

Body of insect discoloured, the general coloration apparently dark brown or grey. Halteres brown, the basal half of the stem paler. Legs broken beyond the trochanters. Wings subhyaline, spotted and dotted with dark brown and grey; the brown marks are at arculus, tip of *Sc*, extending caudad along the cord, and at the outer end of cell

1st M_2 ; the smaller grey clouds are distributed as follows:—Two in cell R ; one each in cells R_3 , R_5 , 2nd M_2 , and M_3 in an almost straight line; cloud in cell Cu at tip of vein Cu_2 ; in cell Cu_1 near the outer end of vein 1st A ; one near base and one near apex of vein 2nd A in cell 1st A ; veins yellow, darker in the infuscated areas. Venation: Sc short, Sc_1 ending just beyond the origin of Rs , Sc_2 not far from its tip and also just beyond the origin of Rs ; Rs relatively short and straight, about one-third longer than the arcuated basal deflection of R_{4+5} ; R_{2+3} angulated at apex; cell 1st M_2 elongate, gently widened distally, about as long as vein M_3 beyond it; basal deflection of Cu_1 at the fork of M . Abdomen brown, the elongate fleshy lobes of the hypopygium a little paler.

Hab. Fiji.

Holotype, ♂, Mount Evans, Lautoka, May 11, 1919 (*W. Greenwood*).

Type in the collection of the British Museum (Natural History).

Limonia veitchi, sp. n.

General coloration greenish yellow; thorax with a black dorso-median stripe that divides on the scutum and scutellum, enclosing a linear pale area; femora brown with a subterminal yellow ring; wings subhyaline, the costal region more yellowish; cord and longitudinal veins narrowly seamed with dark brown.

Male.—Length 8–10 mm.; wing 10–12 mm.

Female.—Length 8.5 mm.; wing 9.5 mm.

Rostrum and palpi brownish black. Antennæ brownish black throughout. Head brown, the vertex blackish medially.

Pronotum pale greenish, with a black, longitudinal, median stripe. Mesothorax pale greenish, in older specimens fading into dull yellow, the præscutum with a black median stripe that divides at the suture into two narrower stripes that cross the mesal portions of the scutal lobes on to the scutellum, the medial areas of both the scutum and scutellum being broadly pale; mediotergite of postnotum black, the mark narrowed posteriorly. Halteres pale green, the knobs dark brown. Legs with the coxæ and trochanters pale greenish; femora obscure yellow at bases, soon passing into dark brown; a subterminal obscure yellow ring that is usually a little less extensive than the black femoral tips; tibiæ and tarsi black. Wings subhyaline, the prearcular cells and cells C and Sc more yellowish; stigma small,

circular, dark brown; the cord, outer end of cell 1st M_2 , and most of the longitudinal veins are narrowly but conspicuously seamed with dark brown. Venation: Sc_1 ending about opposite one-third the length of the basal section of R_{2+3} ; Sc_1 longer than the basal deflection of Cu_1 ; Rs more than three times the deflection of R_{1+5} ; Cu_2 equal to or shorter than the basal deflection of Cu_1 .

Abdominal tergites bicolorous, the narrow base and lateral margins, and the broader apex of each segment, yellow, the extensive median portion dark brown. In the female and some males the yellow at the base of the segments is not indicated.

Hab. Fiji.

Holotype, ♂, Mountains, Laütoka, May 1, 1921 (*W. Greenwood*).

Allotopotype, ♀.

Paratopotypes, 2 ♂'s; *paratype*, ♂ (*R. Veitch*).

Type in the collection of the British Museum (Natural History).

This handsome crane-fly is named in honour of Mr. R. Veitch.

Limonia novæ-brittanicae, sp. n.

General coloration dark brown, the humeral angles of the præscutum and portions of the scutum obscure yellow; legs uniformly dark brown; wings faintly tinged with brown; stigma small, circular; Sc long.

Male.—Length 6.5–8 mm.; wing 8.2–8.5 mm.

Rostrum and palpi dark brown. Antennæ dark brown throughout. Head dark brown.

Pronotum dark brown. Mesonotal præscutum dark brown, the humeral angles very restrictedly obscure yellow; scutum obscure yellow, the centre of each lobe largely brown; scutellum and postnotum brown, the sutures tinged with yellow. Pleura infuscated. Halteres brown, the base of the stem yellow. Legs with the coxæ obscure brownish yellow, the bases of the outer faces of fore and middle coxæ infuscated; trochanters brownish yellow; remainder of the legs dark brown. Wings faintly tinged with brown, iridescent, the subcostal cell a little darker; stigma small, circular, pale brown; veins dark brown. Venation: Sc long, Sc_1 extending to opposite two-thirds the length of the basal section of R_{2+3} ; Sc_1 a little shorter than the basal deflection of R_{4+5} ; Rs a little less than three times the basal deflection of R_{4+5} ; m and outer deflection of M_3 subequal; basal deflection of Cu_1 near mid-length of cell 1st M_2 .

Abdominal tergites dark brown, the caudal and lateral margins a little paler; basal sternites obscure yellow; ventral lobes of hypopygium pale brown.

Hab. New Britain.

Holotype, ♂, Rabaul, May 29, 1922 (G. F. Hill).

Paratopotypes, 3 ♂'s.

Type in the collection of the author.

Libnotes solomonis, sp. n.

Belongs to the *strigivena* group; general coloration yellow; antennal flagellum pale; pleura yellow, narrowly lincate with dark brown; apex of fore femora and bases of all tibiæ blackened; wings yellowish, the veins sparsely variegated with darker but not spotted and dotted as in *L. strigivena* and allies.

Male.—Length 12–13.5 mm.; wing 14–17 mm.

Rostrum and palpi dark brown. Antennæ with the scape dark brown, the flagellum conspicuously brownish yellow. Head greyish brown; vertex between eyes very narrow.

Pronotum obscure yellow. Mesonotal præscutum with the disk brownish grey, the broad sublateral margins fulvous, the extreme edge black; the sublateral margins are separated from the disk by an indistinct brownish border; posterior half of the usual median stripe darker grey, margined on either side by a conspicuous, arcuated, brown line, the entire mark appearing oval; scutum whitish grey medially, the lobes obscure yellow, each with a brown dash in its centre; scutellum obscure yellow; mediotergite of postnotum infuscated medially, obscure yellow laterally. Pleura yellow, whitish pollinose, narrowly longitudinally vittate with dark brown; the more dorsal extending from the corvical sclerites above the fore coxæ to beneath the origin of the halteres; the ventral stripe includes the lower margin of the sternopleura; a third stripe lies along the suture between the mediotergite and pleurotergite of the postnotum, extending backwards on to the abdomen. Halteres yellow, the middle portion of the knobs dark brown. Legs with the coxæ yellow, the fore coxæ infuscated; trochanters yellow; femora obscure yellow, the tips broadly blackened, most conspicuous on the fore femora, on the posterior femora replaced by a subterminal brown annulus; tibial bases conspicuously blackened, on the fore legs about one-half as extensive as the femoral apex; apices of tibiæ darkened; tarsi light brown, the three terminal segments black. Wings tinged with yellow, the costal region brighter;

stigma yellow, the outer end (tip of R_1) with a small brown cloud, the proximal end (Sc_2) with a large and conspicuous dark brown area; cord and outer end of cell 1st M_2 seamed with brown; brown clouds at ends of veins Cu_1 , Cu_2 , 1st A , 2nd A , and the anal angle; veins pale, black in the infuscated areas; Rs interrupted by pale beyond mid-length. Venation: r beyond the tip of R_1 strongly arcuated; inner end of cell 2nd M_2 lying far proximad of cell M_3 ; basal deflection of Cu_1 about one and one-half times its length beyond the fork of M .

Abdominal tergites reddish brown, trivittate with black, the dorsal stripe interrupted at posterior margin of each segment; hypopygium pale.

Hub. Solomon Islands.

Holotype, ♂, Guadacanal Island, January 17-18, 1921 (*J. A. Kusche*).

Paratopotype, ♂.

Type in the collection of the Bishop Museum, Honolulu.

Libnotes greenwoodi, sp. n.,

Belongs to the *strigivena* group; mesonotal præscutum brown with a **W**-shaped transverse yellow band near mid-length; pleura with a longitudinal dark brown stripe; femora with subterminal black and yellow rings; wings subhyaline, heavily variegated along the veins with dark and paler brown; r at tip of R_1 ; inner end of cell 2nd M_2 far proximad of cell M_3 .

Male.—Length 13-14 mm.; wing 18-19 mm.

Female.—Length about 15 mm.; wing 15.5 mm.

Rostrum and palpi dark brown. Antennæ dark brown. Head yellowish brown, the narrow portion of the vertex between the eyes fulvous.

Pronotum pale brownish yellow, the cephalic portion a little infuscated laterally. Mesonotal præscutum brown with an irregular **W**-shaped yellowish cross-band near mid-length; scutum obscure yellow, each lobe with a dark brown centre; scutellum light brown; postnotum with the medio-tergite obscure yellow, with the lateral and cephalic margins infuscated; pleurotergites largely infuscated. Pleura obscure yellow with a conspicuous dark brown longitudinal stripe extending from the postnotal pleurotergite to the propleura, including the basal half of the outer face of the fore coxæ. Halteres yellow, the knobs dark brown. Legs with the fore coxæ as described above; middle and hind coxæ yellow with a conspicuous black spot near mid-length; femora pale

brown, gradually darkening outwardly, with a moderately narrow, dark brown subterminal ring preceded by a slightly wider yellow annulus; extreme apex greenish yellow, this approximately one-half as wide as the brown subterminal ring; tibiæ dark brown, the extreme base and apex black; tarsi black. Wings greyish subhyaline, very extensively spotted and clouded with dark and pale brown along the veins, the clouded areas more extensive than the clear ones; veins greenish yellow and brown, alternated. Venation: tip of R_1 shorter than r ; outer deflection of M_3 lying far distad, so cell 2nd M_2 is from one-third to one-half longer than cell M_3 ; basal deflection of Cu_1 about two-thirds as long as the basal deflection of M_{3+4} .

Abdominal tergites obscure yellow, indistinctly trivittate with dark brown, the median stripe becoming obliterated near mid-length of the organ; sternites and hypopygium yellow. In the female, the median tergal stripe is obliterated.

Hab. Fiji.

Holotype, ♂, Mountains, Laûtoka, January 5, 1921 (W. Greenwood).

Allotopotype, ♀.

Paratopotypes, ♂'s.

Type in the collection of the British Museum (Natural History).

This interesting species is named in honour of the collector, Mr. W. Greenwood.

"Bred from fruits of *Eugenia malaccensis* (Myrtaceæ); egg to emergence not less than 17 days."

Libnotes manni, sp. n.

Belongs to the *samoensis* group; general coloration brown and yellow; sexes strongly dimorphic, especially as regards the wings; mesonotal præscutum with three conspicuous brown stripes; femora pale brown, the tips conspicuously and abruptly light yellow; in the male, R_s short, in alignment with the remaining elements of the cord, r about three times its length beyond the supernumerary cross-vein in cell Sc_1 ; fork of M very wide; caudal margins of segments broadly obscure yellow.

Male.—Length 9 mm.; wing 11 mm.

Female.—Length 7 mm.; wing 8.4 mm.

Rostrum and palpi dark brown. Antennæ with the scapal segments pale brown, the flagellum brownish black. Head with the anterior part of the vertex reduced to a narrow

silvery strip; remainder of vertex darker grey with a conspicuous dark brown median stripe; lateral regions and genæ similarly darkened.

Pronotum obscure brown, dark brown medially. Mesonotal præscutum yellow with a very conspicuous dark brown median stripe and slightly less intense lateral stripes, the median stripe feebly constricted near mid-length of the sclerite; scutum pale, the lobes almost entirely dark brown; scutellum and postnotum yellowish testaceous, darker posteriorly. Pleura testaceous, the propleura and adjoining parts of mesepisternum infuscated. Halteres pale, the knobs brown. Legs with the fore coxæ infuscated, the remaining coxæ and the trochanters yellow; femora pale brown, the tips conspicuously and abruptly light yellow; tibiæ pale brown; tarsi darker brown. Wings faintly tinged with brown, the costal region brighter; in the ♂ the bases of cells *C* and *Sc* are infuscated; stigma conspicuous, oval, brown; brown clouds beyond the cord in cells *Sc*₁ and 1st *R*₁ extending almost to the stigma; a narrow infuscation along the cord; in the ♀ the only infuscation is the small oval stigma. Venation: in the ♂, *Sc* ends just beyond the base of *Rs*, *Sc*₂ not far from its tips; a supernumerary cross-vein in cell *Sc*₁ at the proximal end of the stigma; extreme tip of *R*₁ atrophied; *r* about three times its length beyond the supernumerary cross-vein in cell *Sc*₁; *Rs* short, subequal to the basal section of *M*₁₊₂ and in alignment with the remaining elements of the cord; radial veins deflected strongly caudad in both sexes, but more strongly so in the male; *m* longer and more arcuated than the outer deflection of *M*₃. In the ♀, *Sc* is long, extending far beyond the origin of *Rs*, *Sc*₁ and *Sc*₂ both being beyond the fork of *Rs*; *r* only its length beyond the supernumerary cross-vein in cell *Sc*₁; *Rs* more than twice the basal deflection of *M*₁₊₂ and in alignment with the base of *R*₄₊₅, but not the other elements of the cord; basal deflection of *Cu*₁ at two-fifths the length of cell 1st *M*₂.

Abdomen brown, the segments conspicuously margined caudally with obscure yellow; hypopygium obscure yellow. Ovipositor with the tergal valves slender; sternal valves blackened at base.

Hab. Solomon Islands.

Holotype, ♂, Florida, Tulagi (*W. M. Mann*).

Allotopotype, ♀.

Type in the collection of the Museum of Comparative Zoology.

This species is related to *L. samoensis*, Alexander (Samoa), and *L. subæqualis*, Alexander (North Queensland). It is named in honour of the collector, Dr. W. M. Mann.

Gonomyia (Lipophleps) digitifera, sp. n.

General coloration grey and yellow; femora yellow with two brown annuli; wings greyish subhyaline, sparsely spotted with brown; *Sc* short, cell 1st *M*₂ closed; basistyles of male hypopygium with a slender finger-like lobe on mesal face.

Male.—Length about 3·8 mm.; wing 3·3 mm.

Female.—Length 4–4·5 mm.; wing 3·5–4·3 mm.

Rostrum and palpi dark brown. Antennæ dark brown, the second scapal segment obscure yellow. Head obscure yellow, the vertex dark medially.

Pronotum whitish. Mesonotal præscutum pale brown with three confluent dark grey stripes; tuberculate pits black; pseudo-sutural foveæ pale reddish brown; scutal lobes grey; scutellum yellow with a small median brown spot; mediotergite of postnotum yellow, darker posteriorly. Pleura dark brown with a narrow longitudinal yellow stripe, sparsely pruinose, extending from the fore coxæ to beneath the halteres; dorso-pleural region indistinctly pale. Halteres yellow, the knobs brown. Legs with the coxæ and trochanters yellow; femora yellow with a narrow brown ring immediately beyond mid-length and a broad, conspicuous, brown annulus immediately before the apex, the yellow ring enclosed being a little more extensive than the brown subapical annulus; tibiæ brownish yellow, the tips narrowly blackened; tarsi dark brown, passing into black. Wings greyish subhyaline: stigma oval, pale brown; small dark brown spots at arculus, tip of *Sc*, and tip of vein *R*₂₊₃; less distinct brown seams along the cord and outer end of cell 1st *M*₂; veins pale brown, a little darker in the infuscated areas. Venation: *Sc* short, *Sc*₁ ending immediately beyond the origin of *Rs*, *Sc*₂ at the extreme tip of *Sc*₁; *Rs* long, approximately equal to *R*₂₊₃; cell 1st *M*₂ closed; basal deflection of *Cu*₁ about one-third its length before the fork of *M*.

Abdomen dark brown, the segments with conspicuous pale caudal margins, the genital segment in the female more reddish. Male hypopygium with the basistyles comparatively short and stout, on the mesal face with a slender finger-like lobe directed caudad; two dististyles, the outermost shorter, cylindrical, the apex strongly curved, blackened,

acutely pointed, with a few setae before the tip; inner style longer, gently angulated before apex, the mesal face near base with a densely setiferous fleshy lobe. Gonapophyses appearing as a flattened plate, the caudal margin bifid, each angle produced into an acute blackened point. Beneath this plate project caudad two slender pale filaments.

Hab. Fiji.

Holotype, ♀, Laütoka, March 26, 1920 (*W. Greenwood*).

Allotopotype, a badly broken ♂, April 2, 1920 (*R. Veitch*).

Paratopotypes, ♀, with the type.

Type in the collection of the British Museum (Natural History).

Trentepohlia (Mongoma) brevicellula, sp. n.

Size small (wing under 6 mm.); general coloration uniformly dark brown; legs unicolorous brown; wings tinged with brown; cell 1st M_2 short and broad.

Male.—Length 5.5 mm.; wing 5.8 mm.

Female.—Length 6 mm.; wing 5.7 mm.

Rostrum and palpi brown. Antennae dark brown. Head dark brown.

Mesonotum brown, very slightly paler laterally. Pleura pale brownish yellow. Halteres pale brown, the base of the stem a little brighter. Legs with the coxae and trochanters yellowish testaceous; remainder of the legs uniformly brown, the tarsal segments beyond the metatarsi broken. Wings strongly tinged with brown, cell C , Sc , and the stigma darker brown; veins dark brown. Venation: r variable in position, at or before the fork of R_{2+3} , in some cases the distance about one-half its length; cell 1st M_2 unusually short and broad for a member of this group, widened distally; m usually equal to or a little shorter than the other elements closing cell 1st M_2 ; distal fusion of Cu_2 and 1st A subequal to m .

Abdomen uniformly brown.

Hab. Fiji.

Holotype, ♂, Loloti, December 19, 1920 (*W. Greenwood*).

Allotopotype, ♀.

Paratopotype, 2 ♂'s.

Type in the collection of the British Museum (Natural History).

Epiphragma hebridensis, sp. n.

General coloration dark brown, grey pruinose; centre of disk of mesonotal præscutum clearer grey; wings whitish subhyaline, with an irregular ocelliform brown pattern; abdomen brownish yellow, trivittate with dark brown.

Female.—Length about 10 mm.; wing 9.6 mm.

Rostrum and palpi brown. Antennæ lacking. Head light brown with a darker brown median stripe extending from the vertex to the occiput.

The thorax is rubbed and can be described in general terms only. The præscutum has the disk largely dark grey, the lateral margins dark brown; the region anterior to the pseudosutural foveæ brighter brown; postnotum grey, the mediotergite narrowly darker laterally, pleurotergites greyish brown. Pleura dark brown, grey pruinose, leaving a narrow, longitudinal, brown stripe extending from the cervical sclerites above the fore coxæ to the postnotum. Halteres with the base of the stem yellowish, the remainder broken. Legs with the coxæ and trochanters yellow, the fore coxæ weakly infuscated; remainder of the legs broken. Wings whitish subhyaline with an irregular ocelliform brown pattern; stigmal region yellowish; the brown areas are distributed as follows:—Two large brown circles occupy the basal third of the wing between veins *C* and *Cu*, the first with the base of cell *R* as a centre, the second with the origin of *Rs* as a centre, the two circles being confluent; a narrow seam along the supernumerary cross-vein; very irregular and narrow circles occupy the region of the cord and beyond, including one with its centre at the fork of M_{1+2} ; wing-apex in cells R_3 , R_5 , and M_1 darkened; small brown clouds at ends of veins M_3 and Cu_1 ; conspicuous solid brown clouds in the outer ends of cells Cu_1 , Cu , and 1st *A*, at end of vein 2nd *A* and at mid-length of cell 2nd *A*; veins darker brown. Venation: cell M_1 much shorter than its petiole; basal deflection of Cu_1 at about two-fifths the length of cell 1st M_2 ; one wing of the type has an adventitious cross-vein in cell R_5 beyond the level of *m*.

Abdominal tergites brownish yellow, narrowly trivittate with dark brown; sternites brighter yellow, the lateral stripes even more conspicuous but the median stripe broken into pale brown spots near the base of the segments. Ovipositor with the tergal valves long, slender, curved; sternal valves very short but high.

Hab. New Hebrides.

Holotype, ♀, Port Sandwich, Ile Mallicolo, 1902 (*Dr. Joly*). Type in the collection of the Paris Museum.

Ctenacroscelis lepidus, sp. n.

General coloration yellowish brown, the pleura variegated with darker; wings tinged with yellow, the cubital and anal

cells clouded with brown in their outer ends; lateral lobes of ninth tergite of male hypopygium obliquely truncated, the lateral angles subacute.

Male.—Length about 22 mm.; wing 23 mm.

Female.—Length about 25 mm.; wing 23.8 mm.

Frontal prolongation of the head long, yellow, the ventro-lateral portions dark brown; palpi brown, the terminal segments dark brown. Antennæ reddish fulvous. Head obscure fulvous, indistinctly darker behind.

Pronotum brown, darker brown laterally. Mesonotal præscutum olive-brown, indistinctly marmorate with darker, with three dark brown stripes, these narrowly margined with pale greenish, the median stripe paler anteriorly; scutum olive, each lobe with two separate dark brown marks, the anterior one smaller; postnotum olive, the caudal margin of the mediotergite dark brown. In the female, the markings on the præscutum and scutum are barely indicated. Pleura light yellow, the propleura, a blotch on the mesepisternum, and the ventro-lateral portions of the sternopleura dark brown; a silvery-yellow area on the pleurotergite of the postnotum immediately cephalad of the halteres. Halteres brown, the base of the stems and the knobs yellow. Legs with the fore coxæ largely suffused with brown in the male, the other coxæ brownish olive; trochanters brown; femora brown, the tips a little darkened; tibiæ and tarsi dark brown, the bases of the tibiæ very narrowly pale. Wings tinged with yellow, the bases and cells *C* and *Sc* more saturated; cells *Cu*, 1st *A*, and 2nd *A* yellowish subhyaline, handsomely variegated with irregular brown clouds in the outer ends of the cells; stigma pale brown; basal deflection of *Cu*₁ conspicuously seamed with brown; a narrow but conspicuous oblitative area before the cord; veins brown, narrowly and very indistinctly seamed with pale brown. Venation: *R*₂ sinuous; petiole of cell *M*₁ longer than *m*; fusion of *M*₂ and *Cu*₁ moderately extensive.

Abdomen yellowish brown, the tergites with an indistinct median stripe, the lateral margins of the segments narrowly yellow. Male hypopygium with the lobes of the tergite obliquely truncated, the lateral angles subacute; median notch comparatively broad, subshiny, extending on to the dorso-median area of the tergite as a linear groove. Ninth sterno-pleurite not conspicuously produced; outer dististyle relatively long and narrow, only slightly dilated near mid-length.

Hab. Fiji.

Holotype, ♂, Loloti, December 19, 1920 (*W. Greenwood*).

Allotopotype, ♀.

Type in the collection of the British Museum (Natural History).

Ctenacroscelis walkerianus, sp. n.

General coloration pale brownish yellow, the præscutum with darker stripes; legs unicolorous reddish yellow; wings tinged with greyish yellow, not conspicuously variegated; lateral lobes of ninth tergite of male hypopygium truncate.

Male.—Length about 16 mm.; wing 19 mm.

Frontal prolongation of the head obscure brownish yellow; palpi concolorous, the terminal segment passing into black. Antennæ obscure yellow throughout, the intermediate flagellar segments a little produced on the ventral face, the segments with a very few short black setæ. Head obscure yellow, the vertical tubercle low but conspicuous.

Pronotum pale brown, variegated with darker brown on the sides. Mesonotal præscutum pale brownish yellow, with a greenish cast, the two intermediate præscutal stripes dark brown, only narrowly separated from one another; lateral stripes slightly less distinct; scutal lobes brownish yellow, each with two dark brown areas; scutellum brownish yellow, the lateral sclerites darker; postnotum concolorous with the scutellum, the caudal margin narrowly but conspicuously dark brown. Pleura brownish yellow, variegated with darker brown, especially on the anterior part of the mesoepisternum and around the wing-root; sternopleura dark brown ventrally except on the narrow median area. Halteres pale brown, the extreme base of the stem pale, the knobs obscure yellow. Legs with the fore coxæ a little infuscated on the outer face, the other coxæ yellow; remainder of the legs uniform reddish yellow. Wings with a strong greyish-yellow tinge, more saturated at the base and in cells *C* and *Sc*; stigma very pale brown; pale brown seams along the basal deflection of *Cu*₁ and at the tip of vein 2nd *A*; a narrow transverse oblitative area before the stigma, crossing cell 1st *M*₂ into the base of cell *M*₃; veins pale brown. Venation: *R*₂ moderately arcuated; cell 1st *M*₂ comparatively long and narrow; petiole of cell *M*₁ longer than *m*; fusion of *M*₂ and *Cu*₁ a little shorter than *m*.

Abdominal tergites obscure fulvous brown with a very narrow, dark brown median line; sternites concolorous, the bases of sternites 7 and 8 darker. Male hypopygium with

the lateral lobes of the ninth tergite shiny, rectangular, the mesal angles broadly rounded, the apices truncate, the median notch narrow, at its base with a small conical spine. Ninth sterno pleurite not conspicuously produced; outer dististyle very large and flattened, obliquely truncated at apex, the caudal margin with two rows of short yellow setæ.

Hab. Fiji.

Holotype, ♂, Mount Evans, Laûtoka, April 4, 1920 (*W. Greenwood*).

Type in the collection of the British Museum (Natural History).

This species is dedicated to the memory of Francis Walker.

Nephrotoma solomonis, sp. n.

General coloration orange-yellow; occipital brand lacking; mesonotal præscutum with three brownish-black stripes, the median stripe more or less obliterated at its anterior end; wings with cells *C* and *Sc* yellow; abdominal tergites 1 to 7 with the caudal margins narrowly and evenly blackened.

Male.—Length about 12 mm.; wing 13 mm.

Female.—Length about 14 mm.; wing 13–13.5 mm.

Frontal prolongation of head yellow; palpi pale yellowish brown, the terminal segments darker. Antennæ relatively short, the scape orange; basal segment of flagellum usually pale; flagellar segments feebly bicolorous, the ground-colour light yellowish brown, passing into darker brown on the intermediate segments, the small basal swelling of the segments black. Head orange; no apparent occipital brand.

Pronotum orange. Mesonotal præscutum orange, more yellowish laterally; three brownish-black stripes, the median stripe more or less obliterated on its anterior third, its position faintly indicated by delicate reticulate lines; lateral stripes straight, but the outcurved ends faintly indicated in some specimens; scutum yellow, each lobe with two confluent brown spots, the anterior one smaller; a brown spot above each wing-root; scutellum yellow, faintly infuscated posteriorly; postnotum pale whitish yellow with two contiguous, circular, brown spots at posterior margin. Pleura yellow, very faintly variegated with darker. Halteres dark, the apex of each knob light yellow. Legs with the coxæ and trochanters yellow; femora brownish yellow; tibiæ obscure yellow, the tips very faintly darkened; tarsi dark

brown. Wings strongly tinged with yellow, cells *C* and *Sc* brighter; stigma small, pale brown; wing-tip indistinctly darkened; anal angle faintly darkened; veins brown. Venation: *Rs* nearly straight, subequal to the deflection of *R*₄₊₅; *m-cu* close to or, usually, just beyond the fork of *M*.

Abdominal tergites orange-yellow, the caudal margins of segments 1 to 7 narrowly and evenly blackened; segments 8 and 9 dark brown, the styli of the male hypopygium obscure yellow; sternites yellow. In the female, a transverse black ring near mid-length of tergite 2 (faintly indicated in some male specimens) and the caudal margins of segments 2 to 7 broader, the extreme basal lateral angles slightly infuscated; apices of sternites 2 and 3 very narrowly dark brown.

Hab. Solomon Islands.

Holotype, ♂, Florida, Tulagi (*W. M. Mann*).

Allotopotype, ♀.

Paratopotypes, 6 ♂ ♀'s.

Type in the collection of the Museum of Comparative Zoology.

Nephrotoma opima, sp. n.

Female.—Length 14 mm.; wing 12.5 mm.

Generally similar to *N. solomonis*, sp. n., differing as follows:—

Præscutal stripes entire, the broad median stripe feebly notched at both ends; lateral stripes outcurved, the anterior lateral extensions paler than the stripes themselves; scutellum orange. Wings somewhat darker, the subcostal cell conspicuously dark brown. Abdomen with tergites 1 to 5 orange-yellow, tergites 2 to 5 with broad, velvety-black, caudal rings; segments 3 to 5 with almost equally broad latero-basal triangles; tergite 2 with an oval brownish-black spot on either side of basal ring; sternites 1 to 5 yellow, the caudal margins very narrowly blackened, broadest on sternite 5; segments 6 to 8 inclusive entirely black. Ovipositor with the tergal valves horn-coloured, the sternal valves black at base and before the apices.

Hab. Solomon Islands.

Holotype, ♀, San Cristoval, Pamu (*W. M. Mann*).

Type in the collection of the Museum of Comparative Zoology.

V.—On the Dvinosauridæ, a Family of Labyrinthodonts from the Permian of North Russia. By V. P. AMALITZKY*.

[Plate I.]

AMPHIBIA.

STEGOCEPHALIA.

TEMNOSPONDYLI.

RHACHITOMI.

Dvinosauridæ, fam. nov.

DVINOSAURUS, gen. nov.

I refer to this genus some groups of bones represented by two incomplete skeletons with skulls, one skull with a part of the vertebral column and the pectoral girdle, by another two skulls, a vertebral column, and other isolated bones.

The skeletons and bones in question belong to fairly big animals about 1 metre long, with a large head measuring one-fifth the length of the body, a short tail, strong pectoral girdle and very weak pelvis, short extremities, with 40 vertebræ (approximately) carrying strong ribs save the first three cervical and the very last caudals. Skull triangular in outline; sculpture of single skull-bones according to the pattern of *Meloposaurus* and *Rhytidosteus*; it is very well shown, and consists of distinct sharp ridges radiating from the centres of ossification towards the periphery, which define very distinctly the borders of the separate bones. Orbits very distant from each other, large, situated in the fore half of the skull, closely encircled by separate orbital bones disposed around the orbits, projecting in the shape of a peripheral ring surrounding the orbits, and separated by a furrow from the adjacent bones of the skull. Nasal openings small, oval, situated not far from the orbital openings; in the premaxillary region a small cavum internasale, from which mucous canals are directed backwards towards the orbits, and, farther on, forming a distinct lyre. The frontal bones do not border the orbits. Foramen parietale indistinct. In the middle of the inferior side of the skull there is an elongated parasphenoideum with a long processus cultriformis

* Translated from the Russian ('Akademii Nauk') by his widow, Madame A. Amalitzky. 4to. Petrograd, 1921. 16 pp., 4 pls.

pointed in front, in the shape of a crest implanted in the interstice between converging vomers. The occipital articulation is built according to the pattern of *Trimerorhachis*, Cope; the parasphenoideum is joined posteriorly by the exoccipitalia coalesced at the base, which base may be considered as basioccipitale; foramen magnum not large, triangular in shape, bounded below by the basioccipitale of coalesced exoccipitalia, and above and laterally by lateral processes of the same bones directed to meet each other. Between the condyles there is a depression, the base of which consists of the above-mentioned basioccipitale; the condyles are sharply projecting on each side of foramen magnum, and bear concave articular surfaces for the atlas. Foramina palatina of irregular oval shape, elongated, more narrowed anteriorly than posteriorly; foramina infratemporalia narrow, chink-like. In the occipital region there are foramina posttemporalia and foramina quadrata. The lower jaw is very primitively built: the branches of the jaw do not coalesce in front at the symphysis, and were probably united by a ligament. The articulare, angulare, coronoideum, spleniale, and dentale are sharply defined; there is a postspleniale (*Williston*); on the border between the constituent bones there is a deep furrow. Teeth numerous, conical, longitudinally furrowed, with a large pulpa, situated on the maxillare and palatinum, and in the lower jaw on the dentale and coronoideum. A complicated ossified branchial apparatus, consisting of basibranchiale, keratohyalia, keratobranchialia, and perhaps epibranchialia, is preserved. Vertebrae of rhachitomous type; their body consists of a median unpaired ventral part, intercentrum (hypocentrum), two lateral dorsal parts (pleurocentra), and free low upper arches with short diapophyses and rather large spinous processes. The arches are articulated to each other by præzygapophyses and postzygapophyses; ribs short; articular surfaces widened, depressed in the middle, articulated with the diapophysis and the articular tubercle of the hypocentrum. The first four cervical vertebrae are of different structure: the diapophyses and pleurocentra are wanting; the body consists of stout hypocentra coalesced with the bases of the upper arches, of which the spinous processes extend upwards, but are not grown together. The front surface of the atlas convex in the middle, with an articular surface on each side; the hind surface of the atlas depressed; it is articular for the second vertebra, the latter having a feebly convex front surface. The third and fourth vertebrae are ring-shaped; beginning with the fifth vertebra, all the rest are of rhachitomous type. The

pectoral girdle consists of closely adherent parts: the middle one, episternum, of regular rhombic outline, with a long hinder process sculptured with ridges radiating from the centre, and paired clavicles. The latter are of the shape of a leaf, with curved petiole, oval, the outer surface covered with furrows radiating from the narrow base of the leaf-shaped widening towards the summit and edges. These widened leaf-shaped plane parts of the clavicles cover the upper margins of the episternum, and their pointed summits converge over its upper angle; the narrow, stick-shaped, petiole-like part is curved upwards and articulated with the scapula and cleithrum, of which but indistinct fragments remain. The feebly developed pelvis consists of flat, closely adjacent ischia and five pubes of smaller size; ilia slender, broken off. Tail short, badly preserved. The fore limbs not large; the scapula, ulna, and radius are preserved; other bones unknown.

Dvinosaurus is represented, as it seems, by three species which I name *Dvinosaurus primus*, *D. secundus*, and *D. tertius*. All these species are represented by skulls and more or less well-preserved skeletons. Their specific characters will be described below. As to the generic characters in particular, the following considerations may be added.

Cranium either triangular or triangulo-semioval. A certain outer resemblance with *Rhytidosteus*, Owen, *Tuditatus*, Cope, *Metoposaurus*, Lydekker (*Metopias*, Meyer), and others is observed. The borders of the skull are convex, the maximum of convexity falling in the postorbital part. In the occipital region, and especially in that of the jugal and of the hind part of maxillary bones, the superior part of the skull overlaps the lower jaw and embraces it from outside, while in front, in the anterior part of the maxilla, in the nasal and premaxillary regions the relation is inverse, i. e. the lower jaw projects forwards beyond the upper one. The roof of the skull, generally flat, slopes very gradually towards the premaxillary region. In the parietal region, in front of the postparietalia, on the confines of the parietalia, a feeble concavity is observed; in the temporal region the maximum of convexity falls on the contact between the squamosum and supratemporale; thence, in the temporal region, the lateral surface of the cranium falls abruptly sideways, and towards the lower border constituted of the quadratum, jugule, and quadrato-jugale. Foramen parietale indistinct; there are but traces of its presence in the middle part of the suture between the paired parietal bones. Orbits oval, narrowed in front, widened behind, encircled by an elevated ring of single bones, with furrowed sculpture, almost parallel to the edges

of the orbits; because of this and of the development of the furrow of the mucous canal or lyre, bordering the above bony ring from outside, the latter, very characteristic, is distinctly separated from the other bones of the skull. Nasal openings not large, oval, extended in the same direction as the orbits, separated from the latter by a narrow bridge consisting of lachrymale and præfrontale. In front of the nasale there is a small eminence on the præmaxillare; cavum internasale very small, situated in the upper part of the symphysis between the premaxillary bones. The lyre-shaped mucous canals run backwards from the above-mentioned cavum internasale diverging at an angle towards the lower internal border of the orbits, and join the furrow surrounding the orbital ring. Less distinct canals are present on the paired supratemporalia. The sculpture of the bones consists of sharp ridges and reminds us in this respect particularly of *Metoposaurus*, *Rhytidosteus*, and *Tuditanus*. The outlines of the single bones are shown in the figure of *Drinosaurus primus*, of which the sculpture is sharply defined and beautifully preserved.

The roof of the cranium consists of the following bones:—

Postparietale (supraoccipitale) very distinct, divided by the transverse parietal crest in two parts: (1) the front one bent forward, triangular, sculptured with irregular tubercles—furrows radiating forwards, and (2) the hind one, smooth, quadrangular, feebly sloping backwards. The suture between the paired postparietalia is very distinct, especially in the posterior part.

Tabulare (epioticum) transversely elongated and narrow, divided into two parts, the anterior sculptured with tubercles and the posterior smooth.

Parietale, the largest of cranium-bones, pentahedral, elongated. Feeble tuberculated ridges radiating from its centre and ramifying dichotomously; suture between the bones very distinct. The foramen parietale indistinguishable, but in the front part of the suture there is a gaping which does not exclude the possibility of the existence of the said parietal opening.

Frontale longitudinally elongated, sculptured with ridges radiating forwards, inwards, and backwards from a point situated excentrically near the outer margin. On the external side, bounding the mucous canals, longitudinal ridges are developed parallel to the canals. The suture between the paired bones is very sharply defined.

Nasale of irregular quadrangular outline, with radiating ridges bordering the nasal opening from inside and above.

Præmaxillare not large, elongated transversely, triangular,

with irregular loop-shaped, tuberculated, radiating sculpture, carries numerous teeth, very sharply cutting, wedging into the interspaces between those equally sharp of the lower jaw. This bone is distinctly prominent above the nasal and the lachrymal bones along the border of the mucous canal, forming near the nasal opening an obtuse tubercle. Paired bones, touching one another by their inner angles, form a sharply-defined symphysis and border below the triangular *cavum internasale*.

Maxillare, a narrow, elongated bone sculptured with loop-shaped tubercles and ridges, extends from the *præmaxillare* backwards forming the inferior margin of the nostril, touching the *lachrymale*, bordering below the orbit and joining behind the latter the *jugale*. Carries numerous teeth situated in the front part between those of the lower jaw, and in the hind part lying on the outer side of the lower jaw, which in this place is toothless.

Lachrymale, a small bone covered with irregular tuberculated sculpture; lying between the orbit and the nostril.

Jugale, a large wide bone situated in the middle of the hind outer margin of the orbit, covered with regular ridges directed backwards from the posterior outer angle of the orbital ring, diverging in this direction, and dichotomously ramifying into fine branches.

Quadrato-jugale, a small, longitudinally elongated, triangular bone sculptured with ridges radiating forwards and upwards from the posterior angle formed by the junction with the *quadratum*.

Supratemporale (*prosquamosum*, *Owen*), a sharply-defined triangular bone uniting with the *tabulare*, *parietale*, *postfrontale*, *postorbitale*, and *squamosum*, playing a considerable part in the structure of the parietal region of the cranium. Sculptured with ridges radiating from a point excentrically situated behind.

Squamosum (*prosquamosum*, *auct.*), a large bone, elongated, quadrangular, covering above and on the sides the temporal region; the most prominent part is situated posteriorly in the occipito-temporal region, whence the surface of this bone falls abruptly on the outer side towards the *quadrato-jugale* and *jugale*. Sculpture ridge-shaped, the ridges running from the temporo-parietal region forwards towards the orbital end and downwards to the *jugale* and *quadrato-jugale*.

Postfrontale, a sharply-defined isolated bone lying behind the inner posterior angle of the orbital ring and bordered on the sides and posteriorly by the *parietale*, *supratemporale*,

and postorbitale. The bone in question is bordered in front by the orbital furrow encircling the orbital bony ring; sculptured with ridges radiating fan-like backwards from the anterior tubercle; in front there is a transverse ridge bordering the aforesaid orbital furrow.

Postorbitale, a triangulo-oval bone, feebly exceeding in size the preceding one, extended longitudinally and wedged between the postfrontale, supratemporale, squamosum, and jugale; sculpture consisting of ridges, the latter ramifying dichotomously and diverging fan-like backwards from the anterior orbital angle.

Orbital ring.—The orbits are encircled by a sharply-defined, very characteristic, prominent ring separated from the rest of the peripheral bones by a distinctly marked furrow. The bony ring has a particular sculpture consisting of ridges generally concentric with the orbits and only in the fronto-parietal region directed at an angle towards the orbits. This furrowed sculpture is interrupted in some places, the ring seeming thus composed of separate bone-segments, among which are easily distinguishable (1) the postorbital, (2) the postfrontal, (3) the frontal, (4) the lachrymal, and (5) the maxillary, corresponding to the respective peripheral parts of the brain-case. The above-named bone-segments forming the orbital ring may be taken to be an independent formation corresponding to the orbitalia (suborbitalia, circumorbitalia) of some ganoid fishes.

The orbital furrow, distinctly defined, encircles the above segments of the orbital ring, separating them from the respective peripheral bones. It is more distinct posteriorly than anteriorly.

Orbits anterior, one-third of the skull-length, oval, egg-shaped, wider behind than in front. The frontal margin more concave than the maxillary one; on the palatal side bordered by the pterygoidea, and above by the bony ring.

The lower surface of the cranium.—The crania in all specimens are found to be in articulation with the lower jaw, therefore the whole upper maxillary border, from the pre-maxillary to the quadrate, is hidden by the adjacent lower jaw. The constant occurrence of the lower jaw in articulation with the upper one must be noticed as proving that the articulation was so close that posthumous conditions of preservation did not injure it. This circumstance is also favoured by the above-mentioned character of the articulation, the upper jaw overlapping the lower one posteriorly and covering it, while anteriorly the lower jaw protruded in front of the upper one.

The parasphenoid is shovel-shaped, narrowed in the region of the vomer, where it rises between the paired vomers in the form of a sharp ridge (*processus cultriformis*), and widens in the hind occipital part. The palatal surface of the parasphenoid is feebly convex in its narrow part situated between the foramina palatina, while in the hind widened part it is feebly concave and covered with wrinkled sculpture, generally irregular, the longitudinal direction of the wrinkles prevailing. This phenomenon may be analogous to the so-called shagreen-teeth. In the widened part of the parasphenoid, near the hind edge of the foramina palatina, there is a process directed towards the pterygoideum. The parasphenoid is joined behind by the exoccipitalia, which form two salient condyles; on the lower, palatal, surface it is difficult to trace the boundary between the parasphenoid and the exoccipitalia. The relations between the parasphenoid and the exoccipitalia seem to be very primitive, and recall those in *Trimerorhachis*, Cope, and partly in *Anaschisma*, Branson.

The vomers are paired bones, triangular in outline, separated from each other by the *processus cultriformis* of the parasphenoid; they unite with the palatinum, maxillare, and præmaxillare, and border in front and inside the foramina palatina. In the front part they carry proper teeth.

The pterygoidea are paired bones playing a considerable part in the structure of the lower skull-surface, separating the foramina palatina from the foramina infratemporalia. In each bone there are distinguishable the body and three wings, of which the inner one is directed towards the parasphenoid and, perhaps, the exoccipitale, and borders behind and outside the foramen palatinum; the hind wing extends towards the quadratum and borders outside the foramen infratemporale. The wide fore wing is directed towards the transversum.

Transversum, a small elongated bone passing along the maxillare and joining the pterygoideum and the palatinum; also bordering the foramen palatinum on the outer side.

Palatinum, an elongated bone extending along the anterior part of the maxillary margin and situated between the transversum, maxillare, and vomer; carrying no less than three teeth.

The foramen palatinum is a paired opening, relatively very large, oval in shape, and bordered below and inside by the parasphenoid; in front and inside by the vomer; in front and outside by the palatinum and transversum, and on the outer and back side by the pterygoideum.

The foramen infratemporale is a paired fissure-like opening developed on the sides and posteriorly on the lower surface of the skull and bordered on the inner side by the pterygoideum, behind by the quadrate, and outside by the quadratojugale and jugale.

The occipital part of the cranium.—The region between the supratemporalia and exoccipitalia is very badly preserved. The articular part may be considered as consisting of two exoccipitalia, embracing the foramen magnum and forming at the base two condyles to articulate with the vertebral column. Embracing the foramen magnum from the sides and coalesced to form a vault above it the occipitalia grow further up with the supraoccipitalia. The condyles project backwards and obliquely forwards and inwards towards the depression lying between them. Such a disposition corresponds with the articular surface of the atlas, the latter carrying in the middle a protuberance dividing the articular surfaces for the condyles, which surfaces are situated on the sides and are inclined obliquely outwards. To judge by the description, this region is like the corresponding one in *Trimerorhachis*, Cope. Cope, however, considers it as consisting of basioccipitale, and gives the following description thereof: "the basioccipital bone, though ossified, supports no condyles properly so-called, but a cup-like articulation for the first vertebra, like that of fishes, but which is perforated for the chorda dorsalis. . . . The basioccipital condyloid fossa is transversely hexagonal in outline, the superior border being deeply notched by the superior portion of the fossa chordæ dorsalis. The articular surface itself is funnel-shaped." Yet Broili, on criticizing Cope's description, remarks: "Da dieser Einschnitt, wenn es sich überhaupt um die Gelenkgrube des Basioccipitale und nicht um den an dasselbe fest angepressten Teil des Atlas handelt, jedenfalls doch durch das Medullarrohr eingenommen wurde*." Later on Case also gives the description of the articulation in *Trimerorhachis* according to Cope's scheme: "The basioccipital condyloid fossa is transversely hexagonal in outline, the superior border being deeply notched by the superior portion of the fossæ chordæ dorsalis. The articular surface itself is funnel-shaped. The parasphenoid bone advances far posteriorly under the basioccipital"†. Huene, giving the description of the condyle of *Lysorophus*, built according to the same scheme, says: "The large condyle is crescent-shaped;

* Broili, Perm. Stæg. und Rept. aus Texas. Palæont. Bd. li. p. 33.

† Case, "3. Amphibia and Pisces of the Perm. of N. Amer." Washington, 1911, p. 42.

its outer two-thirds project strongly, they are formed from the exoccipitals; the deeper depression is formed from the basioccipital. This condyle is intermediate between the true reptilian condyle and the true amphibian condyle; as compared with that of *Eryops* the basioccipital is here a little more prominent, but in principle they do not differ" *.

Different points of view have thus been expressed as to the scheme of structure of the occipital articulation in question: (1) this articulation is built according to the ordinary Stegocephalian type, and consists therefore of two exoccipitals; (2) it consists only of the basioccipital depressed in the middle and bearing therefore, mainly on the sides, condylar articulations; and (3) in one and the same occipital articulation there may be distinguished the middle depressed portion consisting of the basioccipital, and two lateral condyles formed of exoccipitals and embracing the foramen magnum from the sides and above. A combination of the opinions expressed respectively by Case and Huene seems to be the most trustworthy, according to which opinions the occipital articulation may be considered as formed in its middle (depressed) portion by the basioccipital, and in its lateral condyles by the exoccipitals. This complicated articulation is underlain, according to Case, by the parasphenoideum advancing posteriorly. The considerations expressed by Cope and Huene as to the genetic relations of the occipital articulation in question are of interest too; the former considers it fish-like, the latter takes it to be transitional amphibio-reptilian. In reality the apparent contradiction is soon eliminated if one compares the condyle in question with those of such primitive reptilians as *Pareiasaurus*, *Seymouria*, and *Kotlassia*, in which they consist of the vertebra-like basioccipital, depressed posteriorly (on its articular surface), and resembling therefore the occipital articulation in fishes. Moreover, such a primitive structure of the condyle, combined with the reptilian character, confirms the repeatedly expressed suggestion that the reptiles were separated from their Stegocephalian ancestry at a very early stage of phylogenetic development, perhaps when the latter still possessed the primitive features of constitution inherited from their fish-like ancestors.

The temporal or lateral sides of the occipital region, symmetrically situated on both sides of the foramen magnum, and encircling this opening of occipital bones, are fairly well preserved and display a rather complicated structure.

* Huene, Fr. v., "The Skull Elements of the Perm. Tetrapoda," Bull. Amer. Mus. Nat. Hist. vol. xxxii. art. xviii. p. 324, Sept. 23, 1913.

At the base a strongly-defined quadrate process of the pterygoideum is distinguishable; the quadratum is noticeable below, and the quadrato-jugale and squamosum on the outer border. Above there are the squamosum, supratemporale (postsquamosum), tabulare (epioticum), and on the inner side the periotica. One may also discern two openings, one large in the region of the quadrate, to which opening Branson* assigns the name of foramen quadratum (according to Woodward, foramen posttemporale†), and another opening on the inner side which Branson calls foramen posttemporale.

Pterygoideum. Its processus quadrato-pterygoideus stout, convex, extending from the body of the pterygoideum to the quadrate and adhering to the inner border of the latter. The processus pterygoideus, as well as the quadrate, participates in the constitution of the articular surface for the lower jaw.

Quadratum sharply defined. A stout bone bearing on its distal end, where it meets the articulare of the lower jaw, a block-like articular surface consisting of a median strong shaft bordered on the sides by concave surfaces to meet the articulation of the lower jaw. The latter articulation is the reverse, having a median groove and a shaft on each side. The proximal end of the quadrate sends a branch upwards and inwards towards the supratemporale, which borders in the shape of a ridge the foramen quadratum on its inner side.

Foramen quadratum.—I give this name to an opening situated on the outer side of the lateral portion of the occipital region. It is elongated in shape, fissure-like, extending obliquely upwards and inwards from the quadrate towards the upper margin of the skull-roof, in the region of supratemporale and squamosum. This opening is bordered on the outer side by the quadrato-jugale and squamosum, below and on the inner side by the quadrate, and above by the supratemporale and squamosum. The opening in question may be identified with the foramen quadratum observed by Branson‡ and described by A. Smith Woodward§ under the name of foramen posttemporale.

Foramen posttemporale.—I give this name to a triangular opening, widened below and narrowed above, situated on the inner side from the preceding one and bordered by the three

* Branson, E., "American Labyrinthodontidæ," Journ. of Geol. vol. xiii. p. 579.

† Woodward, A. S., Proc. Zool. Soc. London, 1904, vol. ii. p. 172, pl. xi.

‡ Loc. cit.

§ Loc. cit.

bones of the periotica—namely, opisthoticum, epioticum, and prooticum. I use the name of foramen posttemporale in Branson's sense.

The branchial apparatus.—Three skulls have, on their palatal side and on the sides of the occiput, a well-preserved branchial apparatus recalling that of the Axolotl. In *Dvinosaurus secundus* we may observe seven little bones lying freely on the palatal side, namely, the median, unpaired, basibranchiale, and three lateral pairs of bones, of which the upper, differing from the rest by its triangular shape, must probably be referred to the keratohyale, while two other pairs (similar in shape, but the anterior and external pair larger, and the posterior internal smaller) belong to the keratobranchialia. Three little bones, joining on both sides the back portion of the occiput, better preserved in *Dvinosaurus primus* than in *D. tertius*, also seem to stand in close relation to the above apparatus. These three paired bones probably correspond to epibranchialia. In *D. primus*, besides the above-mentioned epibranchialia, two pairs of keratohyalia are preserved.

The lower jaw is of a very primitive pattern, similar to that of *Trimerorhachis*, Cope, which has been explained and schematically figured by Williston*. It consists of numerous bones distinctly defined. To the description by Williston a few details may be added. The symphysis is sharply marked by a suture, along which one branch of the dentary is displaced in respect to the other. The sculpture of the outer portion is beautifully shown. It consists mostly of fine ridges; anteriorly it is feebly tuberculate and loop-shaped, while in the middle three fine striæ run longitudinally; posteriorly the furrows radiate from the lower margin upwards. The following bones may be distinguished:—

Dentale, a strong longitudinal bone constituting the margin carrying numerous teeth (over 30); anteriorly, at the symphysis, the bone is sculptured with tubercles which change posteriorly into feebly radiating ridges replaced farther on by faint longitudinal wrinkles, almost smooth.

Spleniale, an elongated bone, not large, embracing the jaw from below, under the dentale; sculptured with longitudinal ridges. A postspleniale is developed behind the spleniale. A small bone embracing the jaw from below and on the sides beneath the dentale and the angularis, with feebly radiating sculpture on the lower side.

* Williston, S. W., "The Primitive Structure of the Mandible in Amphibians and Reptiles," Journ. Geology, vol. xxi. no. 7.

Angulare, a strong elongated bone, convex, feebly projecting downwards, sculptured with radiating ridges; separated by a furrow anteriorly from the postspleniale and dentale, and posteriorly from the articulare.

Articulare, a strong bone, protruding backwards, with radiating sculpture on the outer side, bearing above, in the median portion, a depressed articular surface, upon which the block-shaped articulation of the quadrate rests.

Prearticulare, the front continuation of the preceding bone forming the inner wall of the jaw in its posterior half; joined from below by the angulare and postspleniale, from above by the coronoideum; it constitutes the upper margin of the foramen meckelianum posterius.

Coronoideum, a small longitudinal bone, joining above the dentale and angulare; carrying a few simple teeth.

On the inner side of the lower jaw there are three openings: posteriorly and above a very large one, foramen meckelianum posterius, leading to a deep cavity and bordered from above by the angulare, articulare, prearticulare, and coronoideum; and two small openings below, namely, the foramen chordæ tympani, situated posteriorly, on the junction of the angulare, prearticulare, and postspleniale, and another smaller opening, foramen meckelianum anterius, lying anteriorly, in the region of the spleniale.

Teeth well preserved in the upper jaw, over 30 on each side, and in worse preservation in the lower jaw. Besides these simple teeth, traces of very strong teeth are preserved on the palatal bones, as well in the second row in the lower jaw, in front. There appears to be here the same differentiation of the teeth as in higher Stegocephalia.

Dimensions of the cranium in mm.

	<i>D. primus.</i>	<i>D. secundus.</i>	<i>D. tertius.</i>
1. From the postparietale to the symphysis of the lower jaw	175	220	180
2. From the occipito-parietal crest to the premaxillare	100	180	165
3. Width of the hind border at the occiput	185	235	235
4. Width of the cranium at the orbits	150	190	185
5. Width of the cranium at the nostrils	85	105	95
6. Height of the occipital part	45	80	70
7. Height of the premaxillare	20	35	35

The difference between these species is expressed best by the relation of the length of the brain-case (2) to the width of the hind border (3). In *D. primus* it equals 0·86; in

D. secundus 0·77; in *D. tertius* 0·70. The maximum length of the whole skeleton in *D. secundus* exceeds 1 m. (111 cm.); in *D. tertius* it is about 1 m.; and in *D. primus* probably under 1 m.

The length of the head is about one-fifth of the whole skeleton.

Systematic Position.—The group of Stegocephalia here described, which I place in the family of Dvinosauridæ, is characterized by very primitive features, such as: structure of the vertebræ of rhachitomous type, pattern of the occipital articulation, presence of orbitalia, complicated constitution of the lower jaw with full number of primitive bones, development of the branchial apparatus, simple structure of teeth, and primitive pectoral girdle. On the other hand, they display progressive characters, to which may be referred the complicated structure of the cranial bones, lyre-shaped mucous canals, ossification of the occipital region, and differentiation in the dentition. Finally, in the same group, the reduction of some characters may be noticed, as for instance that of the foramen parietale and, partly, of the pelvic bones.

The primitive structure of the vertebræ places the group in question in the order of Temnospondyli, section Rhachitomi. Some of their primitive features, as the structure of the occipital condyle and the complicated constitution of the lower jaw, point to the resemblance with the Trimerorhachidæ, Case; the presence of a well-defined branchial apparatus connects them with the Lysorophidæ, Case, which are considered by Williston as representatives of the group of Ichthyoidea. The pectoral girdle is somewhat like that of *Discosaurus*, Credner, from the Permian of Western Europe; the complicated sculpture of the skull-bones resembles that of the highly-developed Triassic (mainly West European) forms, *Metoposaurus*, *Capitosaurus*, and *Trematosaurus*; the lyre-shaped structure of the mucous canals recalls *Trematosaurus*. The above reasons induce me to separate the group in question into a special family placed as the highest member of the Rhachitomi, which family must be taken to be a lateral progressive branch of mainly aquatic forms retaining the breathing by gills. Moreover, one must notice the likeness of this family to North American forms from Texas as regards the primitive characters, and particularly its resemblance to West European Triassic forms in its progressive features.

Dvinosaurus primus, sp. n. (Pl. I.)

The species is represented by an anterior portion of the skeleton, consisting of a well-preserved cranium with the branchial apparatus, pectoral girdle, and part of the vertebral column. In addition, there are an isolated skull-roof, a portion of a vertebral column, a lower jaw, and some limb-bones. The specimen figured is flattened in the vertical direction and feebly dislocated on the sides, the left side being thus a little larger and more convex than the right; the branches of the lower jaw are displaced at the symphysis with respect to each other.

Locality. Excavations at Sokolki.

Dvinosaurus secundus, sp. n.

The largest of the three species. Known by an incomplete skeleton, over 1 m. long, consisting of skull, vertebral column with ribs and pelvis, and several hind-limb bones. The upper surface of the cranium is badly preserved, while the lower one is in very good preservation. There is a branchial apparatus consisting of one median bone and three paired bones.

Locality. Excavations at Sokolki.

Dvinosaurus tertius, sp. n.

Known by an incomplete skeleton, about 1 m. long, in which are preserved the skull (very badly), with three bones of the branchial apparatus developed anteriorly, the vertebral column with ribs and remains of limbs. In addition two similar skulls have also been prepared.

Locality. Excavations at Sokolki.

BIBLIOGRAPHY.

- OWEN, R. Descriptive and Illustrated Catalogue of the Fossil Reptiles of South Africa in the Collections of the British Museum, 1876.
- . "On a Labyrinthodont Amphibian (*Rhytidosteus capensis*) from the Trias of the Orange Free State." Q. J. G. S. 1884, vol. xi. p. 383.
- BROILI, F. "Permische Stegocephalen und Reptilien von Texas." Palæont. bd. 51 (1904).
- WOODWARD, A. SMITH. "On Two new Labyrinthodont Skulls of the Genera *Capitosaurus* and *Aphaneramma*." Proc. Zool. Sec. London, 1904, vol. ii. p. 172.
- BRANSON, E. "Structure and Relationships of American Labyrinthodontidæ." Journ. Geol. vol. xiii. no. 7, 1905.
- JAEKEL, O. "Ueber die primäre Gliederung des Unterkiefers." Sitz.-Ber. d. Ges. Naturf. Freunde, Berlin. 1905.
- WILLISTON, S. W. "*Lysorophus*, a Permian Urodele." Biol. Bull. vol. xv. no. 5, 1905, pp. 229-240.
- CASE, E. C. "Notes on the Skull of *Lysorophus tricarinatus*." Bull. Amer. Mus. Nat. Hist. vol. xxiv. art. xxvi. 1908, pp. 531-533.

- MOODIE, R. "The Ancestry of the Caudate Amphibia." Amer. Natur. vol. xlii. no. 498 (1908).
- WILLISTON, S. W. "The Faunal Relations of the Early Vertebrates." Journ. Geol. 1909, vol. xvii. p. 389.
- MOODIE, R. "Contribution to a Monograph of the Extinct Amphibia of North America. New Forms from the Carboniferous." Journ. Geol. 1909, vol. xvii. p. 38.
- ZITTEL, K. A. v. Grundzüge der Paläontologie, ii. Abt. 1911.
- CASE, E. C. Revision of the Amphibia and Pisces of the Permian of North America, 1911.
- WILLISTON, S. W., and CASE, E. C. "The Permo-Carboniferous Vertebrates of Northern New Mexico." Journ. Geol. vol. xx. (1912).
- SCHROEDER, H. "Ein Stegocephalen-Schädel von Helgoland." Jahrb. d. Preuss. Geol. Landesanst. bd. xxxiii. theil ii. heft 2 (1912).
- CASE, E. C., WILLISTON, S. W., and MEHL, M. Permo-Carboniferous Vertebrates from New Mexico, 1913.
- WILLISTON, S. W. "The Primitive Structure of the Mandible in Amphibians and Reptiles." Journ. Geol. vol. xxi. (1913).

EXPLANATION OF PLATE I.

Dvinosaurus primus. Anterior part of the skeleton from above.
c.int.n., cavum internasale; *pr.mx.*, præmaxilla; *nar.*, nares;
na., nasale; *lar.*, lacrimale; *mx.*, maxilla; *jug.*, jugale;
qujug., quadrato-jugale; *qu.*, quadratum; *sq.*, squamosum;
fr., frontale; *ptfr.*, postfrontale; *ptor.*, postorbitale; *par.*,
 parietale; *tb.*, tabulare (epioticum); *pp.*, postparietale (supra-
 occipitale); *sptp.*, supratemporale (prosquamosum); *cl.*, clavi-
 cula; *sc.*, scapula; *epbr.*, epibranchiale.

VI.—On a new *Cotylosauria* of the Family Seymouridæ from the Permian of North Russia. By V. P. AMALITZKY*.

REPTILIA.

COTYLOSAURIA, Cope.

1911. Seymouridæ, Williston, S. W. "A new Family of Reptiles from the Permian of New Mexico." Amer. Journ. Sci. vol. xxxi., May 1911, p. 391.

KOTLASSIA, subgen. nov.

COMPARISON.

1904. *Seymouria*, Broili, F., Permische Stegocephalen und Reptilien aus Texas, Palæont. bd. 51, p. 81, taf. xiii. figs. 1-3.
1911. Williston, S. W., "Restoration of *Seymouria baylorensis*, Broili," Journ. Geol. vol. xix. pp. 232-36.
1913. *Seymouria*, Huene, F. von, "The Skull Elements of the Permian Tetrapoda," Bull. Amer. Mus. Nat. Hist. N. York, vol. xxxii. pp. 315-386.

GENERAL REMARKS.

The subgenus here described, difficultly distinguishable from *Seymouria*, Broili, from the Lower Permian of Texas,

* Translated from the Russian ('Akademii Nauk') by his widow, Madame A. Amalitzky. 4to. Petrograd, 1921. 14 pp., 3 pls.

was discovered during excavations on the North Dvina represented by two incomplete skeletons—one skull with remains of vertebræ and one with those of the pectoral girdle. The material collected is not only sufficient for referring *Kotlassia* to the genus *Seymouria* on bones common to both forms and with the same distinctive characters, but it completes our knowledge of *Seymouria*, of which no specimens are known in particularly good preservation, while its organization is worthy of the special attention of palæontologists. The fact that Williston has restored the skeleton of *Seymouria* from isolated bones is of particular interest. Meanwhile, the North Dvina excavations have furnished a complete skeleton, with skull, pelvis, and one hind limb, which allows us to compare the results of theoretical considerations with actuality. Though looking on *Kotlassia* as belonging to the family of Seymouridæ, and even to the genus *Seymouria*, I separate it into a distinct subgenus, firstly, on account of some morphological differences between the Russian representatives and those of Texas, and, secondly, because of the different age of the deposits and of the enormous distance lying between them.

General Appearance.—Lizard-like form, 125 cm. long, with small head, long body, and tail about one-half of the latter. The ratio between the length of single parts of the skeleton in the most nearly complete skeleton is as follows:—Skull 12 cm., body 73 cm., and tail 40 cm. Skull triangular in outline, pointed forwards. The wide occipital base bears on its sides the auricular depressions; skull-roof slightly convex; the convexity slopes very gently backwards, somewhat more sharply forwards, and abruptly sideways. On the sides of the skull, in the middle part, but somewhat anteriorly, round orbits are situated. In front there are divided nostrils, directed forward. The foramen parietale is present, but not distinctly shown. Sculpture of skull-bones according to the Stegocephalian pattern, the anastomosing vermiform ridges slightly tend to radiation and resemble those of *Seymouria*. The skull is one-tenth of the whole length of the skeleton, the tail one-third; the latter seems to be vigorous (its left side is not worked out, to preserve the vertebræ); the seven pectoral ribs have much enlarged distal ends converging towards each other. The rest of the ribs are normal, increasing in size up to the eleventh, and then decreasing to the 31st rib; tail without ribs. Vertebræ 55–57 in number: atlas, epistropheus, 23–24 præsacral, 2 sacral, and 28–29 caudals. Vertebræ biconcave; intercentra present. Pectoral girdle with free

épisternum and clavicula; coracoideum fused with scapula and cleithrum. Pelvis coalesced, strong, arranged according to the Cotylosaurian pattern; similar to that of *Labidosaurus*. Humerus and ulna, of the Cotylosaurian type, are also known. Hind limbs strong and well preserved.

Skull-roof.—The occipital part of the skull-roof is bordered posteriorly, between the auricular depressions, by two postparietalia extended laterally. On the sides of the postparietalia narrow tabularia are developed. The upper, horizontal, portion of these bones which participates in the constitution of the skull-roof, is separated from the lower vertical portion, the latter embracing the occipital region above in the form of a crest. The upper part of these bones is sculptured independently of the rest of the bone-surface, the sculpture having the same character as on the other surface-bones. In front of the postparietalia large parietalia are situated; they are somewhat convex longitudinally in the median portion and covered with a loop-shaped sculpture diverging star-like from the centre. The parietalia are quadrangular in outline, extended longitudinally, with rounded angles; sutures uneven. Between them, in the anterior quarter, there is an indistinct foramen parietale.

Anterior to these bones are situated quadrangular frontalia, extended forwards; they are smaller than the preceding bones, and feebly convex longitudinally, with the sculpture vermiculate, radiating from the centre; margins sinuous. Posteriorly the frontalia are slightly wedged between the parietalia, and anteriorly between the nasalia.

Nasalia of smaller size than the preceding bones; longitudinally convex; they border the nares from above and inside, and are covered with vermiculating sculpture.

Anterior to the frontalia, between the nasale, maxillare, and lacrimale, in front of the orbits, there is a sharply-outlined, small, convex, quadrangular præfrontale. Behind and on the sides of the frontalia, the longitudinally curved postfrontale is distinctly developed, bordering the orbits on the inside; and posterior to the latter there is the small postorbitale with sharp outlines. In front of the orbit there is a small lacrimale, not very distinct.

On the sides the brain-case is bordered by the strong quadratum, the indistinctly outlined quadrato-jugale, the sharply defined jugale, bordering the orbit below, and the long maxillare.

Between the quadratum, quadrato-jugale, and jugale on the outer side, and the parietale on the inner side, the skull-walls consist of the distinctly outlined supratemporalia

bordering anteriorly the auricular depression, the small oval squamosa, and the quite independent, convex, small intertemporalia.

The maxillare bears numerous simple cutting-teeth.

The lower Surface of the Cranium.—In the specimen here described, the sphenoid region is displaced, but the relations between the bones remain, nevertheless, distinct. The middle part is occupied by the parietal and sphenoid bones. On the sides of this axial part strong, lamellar pterygoidea are developed, which bones and the aforesaid axial part form a whole palatal roof interrupted anteriorly and on the sides by the internal nares, and posteriorly and on the sides by the openings of the inner temporal fossæ.

The constitution of the axial region is very characteristic. The small, but massive basioccipitale protrudes backwards and carries a concave condyle divided by a slight depression into two lobes. On the sides of the basioccipitale are large and strong exoccipitalia, which play the main part in the constitution of the occiput. Anterior to the basioccipitale is situated the wide and strong basisphenoideum, bordered on the sides by two massive shafts. Farther forwards, the basisphenoideum passes into the rostrum, the so-called præsphenoideum (perhaps, parasphenoideum), separated from the basisphenoideum by a sharp suture, which bone narrowing forwards reaches the small vomer (prævomer). The præsphenoideum is of much larger size than in *Seymouria*; it covers the fissure between the pterygoidea on its whole extent, and, as well as the latter, takes part in the structure of the solid palate.

The pterygoidea are elongated in shape, widened behind and narrowed in front. They are longitudinally convex on the inner side; and from this convexity the bone falls abruptly towards the præsphenoideum and more gently towards the maxillare. The pterygoideum has a posterior process towards the quadrate. Together with the latter the process borders the auricular depressions below and in front.

The palatina are narrow bones situated in front and outside of the pterygoidea. They are adjacent to the maxillaria, and bear small cutting-teeth.

Vomer (prævomer), a small cuneiform, triangular bone, situated in front of the præsphenoideum and dividing the internal nares from each other.

Shagreen Teeth.—With this name one usually designates an irregular tuberculate unevenness or rugosity, developed in some Stegocephalia and in Therocephalia on the palatal

surface of the brain-case. Such shagreen teeth are situated in the form here described on the back portion of the pterygoideum joining the temporal depression, as well on the base of the præspheoideum.

The teeth are of conical pointed shape, very small, numerous, forming one row on the maxilla, as well on the palate-bones and anteriorly on the sides of the pterygoidea.

The internal nares are situated in the fore part of the palatal surface, oval in shape and small in size; separated from each other by the vomer and bordered by the palatina and pterygoidea.

Foramina interpterygoidea are relatively large; situated behind the pterygoids, bordered in front and from inside by the pterygoids, behind by the quadrate, and from outside by the quadrato-jugale.

The Occiput.—The large foramen magnum is bordered by the basioccipitale, exoccipitalia, postparietalia (supraoccipitalia), and tabularia (epiotica). Below there is a very massive basioccipitale sharply protruding backwards and forming the condyle, elongated transversely and depressed on the articular surface; on the sides of the foramen magnum are strong inner processes of the exoccipitalia, which processes, widening upwards, unite with the epiotica; the foramen magnum is bordered from above by the postparietalia (supraoccipitalia). Above, on the sides of the occipital region, are deep paired depressions bordered below and outside by the lateral processes of the exoccipitalia, and inside and above by the epiotica. The occipital condyle is more depressed and situated than in *Seymouria*. The inner exoccipitalia, bordering the foramen magnum from the sides, are also more strongly developed.

The Mandible.—In all specimens the mandible is preserved as a whole or in part. Its sculpture, like that of the brain-case, is loop-shaped. The teeth are uniform, pointed, conical, covered with feebly marked longitudinal ridges; they are numerous, above twenty on each side. Sutures between the single bones constituting the mandible, distinct. A small articulare, at its articulation with the quadratum, and a rather strong angulare, which is joined by the spleniale from below and by the dentale in front, are distinguishable.

Dimensions of the Cranium.—Below are given the dimensions of skulls in four specimens, two specimens of *Kotlassia prima*, and two of *K. secunda*, and, for comparison, those of *Seymouria*:—

	<i>Seymouria.</i>	<i>K. prima.</i>		<i>K. secunda.</i>	
		1.	2.	1.	2.
1. Width of the skull in the occipital region	10.5	14	12	9.5	8.5
2. Length on the median line	10.2	12.5	11.5	8.5	7.5
3. Distance from orbits to auricular depressions	1.8	4.4	4	2.5	2.5
4. Distance between orbits	3.1	6.2	4	3.5	2.5
5. Length of orbits	2.7	2.9	2.8	2.7	2
6. Width of orbits	2.6	2.6	2.6	2.4	1.6

The skulls being dislocated, no particularly exact measures can be taken. I would only point out that the skull in *Kotlassia* is relatively wider in the occipital region, and the orbits are situated more forwards than in *Seymouria*.

The Vertebral Column.—The vertebræ are about 55–57 in number. As already said, the following vertebræ are distinguishable: 23–24 præsacral, 2 sacral, and 28–29 caudals. The distinctive feature of the vertebral column consists in its strong ribs, which are present in the whole præsacral and partly in the sacral region. By its outer appearance the skeleton suggests that of the Rhynchocephalians and, particularly, of Sphenodonts. The presence and the character of the ribs distinguish the rest of the vertebræ from the first two cervicals, of which the ribs are unknown, though their existence is possible; 6 anterior vertebræ bear characteristic ribs, of which the distal ends are shovel-like, enlarged, and closely adjacent to each other; 18 præsacral vertebræ have normal ribs, 2 sacral ones; 4 vertebræ bear ribs progressively decreasing in size; 7 vertebræ lack ribs, and the remainder have well-developed inferior arches, with upper and lower spinous processes.

Vertebræ.—Atlas badly preserved; nevertheless, a well-developed biconcave ring with a hypophysial keel on the ventral surface, and two single tubercles on the sides, can be distinguished as remains of the bases of the upper arches. The epistropheus is on the pattern of *Lubidosaurus*, immediately adhering to the atlas, without the intermediary intercentrum; the body of the vertebra is biconcave, exceeding in size the atlas; its upper arches are wide, the spinous process very stout, exceeding the other in size, directed backwards; diapophyses not large, directed sideways and backwards; postzygapophysis present; præzygapophysis missing. Præsacral vertebræ 24 in number, separated from each other by intercentra. Body of the vertebra biconcave, narrowed in the median part, enlarged fore and back, longitudinally flattened in the upper portion. The vertebræ are articulated with each other by means of horizontal præzygapophyses

and postzygapophyses; spinous processes parting from upper arches near the præzygapophyses, narrowed in front, enlarged behind; heads thickened, straight, high; diapophyses short, stout, directed backwards, parting immediately from the base of the upper arches, below the præzygapophyses.

Sacral vertebræ, numbering 2, the first with wide diapophyses coalesced with the ilium, the second narrower diapophyses, and perhaps ribs.

Among the caudal vertebræ the following are distinguishable:—The first 6 vertebræ following the sacrals bear ribs rapidly decreasing in size backwards; the next 5 vertebræ bear strong, pointed upper spinous processes, directed backwards, and residual short diapophyses; they are followed by the rest of the vertebræ, gradually decreasing in size, provided with lower and upper arches with sharply defined pointed spinous processes.

Ribs.—The first 7 ribs differ from the rest by the following peculiarities:—Their distal and partly their proximal ends, particularly the former, are enlarged; the much widened distal ends adhere (perhaps coalesce) by their lower surface to the upper one of the distal enlargement of the rib following next behind, the inferior margin of the system of such adhering pectoral ribs acquiring thus a saw-like aspect; between the proximal parts of the distally adhering ribs are free spaces. The sixth and seventh ribs carry on their distal ends a small hook-shaped process, by means of which they are fastened to the next rib, like the *processus uncinatus* in *Rhynchocephalia*ns. Such ribs were described by Credner in *Discosaurus* from the Permian of the Pilsen-basin, and similar ribs are described by Hueene* as belonging to *Eurycervix posthumus* from a bone-bed in the Muschelkalk. Broili has described them in *Seymouria*, but from a specimen not so well preserved as the *Kollassia* in question. The first rib, lying isolated on the left side of the skeleton and inclined against the atlas, is dislocated; nevertheless, its distal enlargement is well preserved. The second rib, next in size, inclined against the epistropheus and corresponding, perhaps, to the first normal vertebra, has a wide, somewhat thickened, proximal, single-headed end, a body narrowed in the middle, and a much enlarged distal end. This rib and the following ones are shovel-shaped; the next rib is larger in size and has a more widened distal end; the 4th and 5th ribs are in normal articulation with the vertebra, adhering to a strong diapophysis; the 6th rib

* Hueene, F. v., "Uebersicht über der Reptilien Trias," Paläont. Abh. Band. x.-vi. Heft 1 (1909).

bears on the widened distal end two lobes, of which the upper wider one adheres to the body of the following rib, and the lower, more curved and pointed, to the distal enlargement of the rib. The 7th rib has a like-lobed distal enlargement, though of smaller size. The following ribs, beginning with the 8th, are normal, from the 8th to 11th they become longer, from the 12th to the 24th the ribs shorten until the sacrum. Then follow the first wide sacral rib, and perhaps the enlarged diapophysis; the second narrow sacral rib; the first postsacral rib longer than the posterior presacral ones, the second postsacral of still larger size, and then the gradually decreasing 3rd, 4th, and 5th postsacral ribs.

Pectoral Girdle.—This consists of the scapula coalesced with the coracoideum, and of the cleithrum, clavícula, and episternum. The scapula lies with its upper end on the enlarged distal edges of the 6th and 7th ribs, whence it is directed downwards and forwards, so that the præcoracoid and coracoid, at an angle to each other, are situated below the ribs almost horizontally. On the lower side, the space between the paired coracoidea is filled up with the episternum, situated between the latter, in the shape of a plate anteriorly rhombic in outline and extending posteriorly into a long process; the claviculæ, adhering in front, contribute to close the interstice. In general, the pectoral girdle is built according to the pattern of *Seymouria* and *Labidosaurus*. It consists of the paired præcoracoideum and cleithrum, coalesced with scapula and coracoideum, paired clavícula, and unpaired episternum. All these bones are united on the ventral side with the unpaired episternum, forming a semicircle, which embraces the breast below and adheres by the upper edges of the scapula to the enlarged distal ends of the 6th and 7th ribs. Among the material collected one may observe in various specimens correlations between more or less disjointed parts of the pectoral girdle. In one case only is an isolated girdle entirely preserved, in which the relationship of all the mentioned bones are distinguishable, though unfortunately only on the lower side. These bones adhere so closely to each other that, if occurring together, they are difficult to separate in the preparation. The lower part of the breast is formed by the stout episternum, widened in front and narrowed behind; anteriorly it is joined from both sides by the shovel-like enlargements of the claviculæ overlying its outer inferior surface; the widened distal ends of the clavicles meet in the middle of the episternum, while

their narrow proximal ends extend upwards embracing the upper part of the coracoideum and the base of the scapula from in front and below, adhering further on to the well-developed cleithrum. Below, at the junction of the lower surface of the pectoral girdle, besides the episternum and the clavicles, there also take part the stout coracoids, bent towards the scapula almost at a right angle and adhering by their inner margins to the episternum.

The episternum is preserved in one specimen only. It is almost rounded in outline on the fore end, where it is much enlarged, and narrowed in the shape of a long process at the back. The outer (lower) surface is badly preserved, though remains of loop-shaped sculpture are visible, radiating from the centre; on the opposite side a radiating sculpture is preserved in the shape of fine striæ and grooves.

The clavícula has the shape of a curved spoon and consists of two parts, the upper one, handle-shaped, narrow, adhering to the front edge of the scapula, and gradually narrowing upwards, along the margin of the scapula, and adhering to the narrow cleithrum; and the lower one spoon-like, enlarged and curved at an angle to the former inwards, towards the ventral side and overlying the lateral part of the upper enlargement of the episternum, taking part in the symphysis of the pectoral girdle. The lower surface of the spoon-shaped enlargement is somewhat convex and is covered with tuberculate sculpture radiating from the narrowed part upon the enlarged one, which radiation begins where the lateral upper part turns at an angle to the lower ventral one.

The cleithrum is a small shaft-like bone, coalesced along the front margin of the scapula and separated by a sharp suture from the upper, wedging out border of the clavícula.

The scapula and coracoideum coalesce and are in general on the pattern of *Labidosaurus*. The coracoideum and præcoracoideum, grown together to form one bone, adhere at an angle to the strong elongated scapula, the latter with parallel fore and hind margins, and are directed inwards towards the ventral side, to meet the episternum. On the border between the scapula and coracoides there is a deep *cavitas glenoides* for the articulation with the humerus, bordered behind by the margin of the scapula above and by that of the coracoid below.

Pelvis.—This is in a very good state of preservation, on the pattern of *Labidosaurus*, *Eryops*, and *Limnoscelis*. It is fixed to one sacral vertebra which differs from others by a considerable enlargement of the diapophysis; to the latter is fastened a very wide rib, coalesced by its distal enlarged end

with the front part of the ilium. The first postsacral vertebra, also partly entering into the constitution of the pelvis, differs from the normal one by a certain enlargement of the diapophysis and by a normal rib, coalesced by its distal end with the hind margin of the ilium (yet having sometimes a free distal end). The pelvis consists of distinctly defined ilia, ischia, and pubes; the lateral sides bear large acetabula at the union of the ischium, pubis, and the base of the ilium and the upper (sacral) part of the latter bone.

The lower surface of the pelvis is, on the whole, flat, quadrangular in shape, narrowed behind and widened in front; divided in the middle by a longitudinal symphyseal keel, increasing in height backwards, into two symmetrical parts. The hind margin is notched because of the ischia protruding backwards; the projecting forwards of the anterior margins of the pubes makes the front margin feebly notched too; the lateral sides are also situated along the lower border of the acetabulum.

The pubis is a quadrangular bone, and its hinder outer margin takes part in forming the acetabulum. The latter margin is pierced by a foramen pubicum (f. obturatorium).

The ischium is quadrangular in outline, longitudinally extended, and concave in the middle; the inner sides of the paired ischia, adhering by their right-angulated margins, form the hind elevated part of the symphyseal keel; the outer side has in front a strongly projecting margin, bordering the acetabular lateral cavity, and behind it there is a slight notch. The anterior margin coalesces by a straight suture with the pubis. The posterior margin turns inwards and forwards to form, with the similar border of its fellow of the opposite side, the hind notch of the pelvis.

The ilium stands at right angles to the base of the pelvis; one may distinguish its wing-like dilated sacral part, raised above the ribs and narrowing in a vertical direction into a neck followed by another widening depressed to form the acetabulum. The sacral part is shovel-like, enlarged in front, and extended and narrowed wing-like behind; the upper margin is somewhat concave; in front there is the incisura ilio-pubica, and posteriorly the incisura ilio-ischiatica, forming the above-mentioned neck. In the middle of the outer side, from the projecting posterior margin to the incisura ilio-pubica an obtuse keel runs obliquely forwards and downwards. The front continuation of the keel forms the anterior margin of the acetabulum.

The acetabulum is a deep articular fossa of elongate-oval

shape, formed by the coalesced inward corresponding parts of the ilium, ischium, and pubis. This fossa is bordered below, anteriorly, and above by distinctly protruding margins, and is open posteriorly.

The pelvis is slightly bent forwards, so that the distance between the vertebral column and the pubis is greater than that between the vertebral column and the ischia.

Extremities.—Of the fore limbs of *Kollassia prima* here described, the humerus and ulna of the right side are preserved, and, moreover, the whole left hind limb. The humerus is found in dislocated articulation with the glenoid fossa, while the hind limb, though having conserved the almost normal articulations between the single bones, is unnaturally extended forwards with the phalanges lying on the ribs.

The right humerus is known. In spite of unsatisfactory preservation, a general resemblance may be observed to the humerus described by Broili in the genus *Aspidosaurus*. Its distal end is turned at right-angles to the proximal end, as in *Labidosaurus*. At the proximal end there is a sharply defined head with articular surface; at the beginning of the crista ventralis (deltoidea) a distinct tubercle. There is probably a foramen entepicondyloideum. On the distal end facets for the ulna and radius are visible.

The ulna very well preserved; it is on the pattern of the ulna in *Pareiasaurus*, and therefore similar to that of mammals. The proximal apophysis, very convex on the outer side, has a sharply defined olecranon with incisura sigmoidea major for the articulation with the radius. The body of the bone is laterally compressed, and depressed even longitudinally on the radial side; the distal epiphysis is somewhat dilated and has an oval cross-section.

The hind limb is rather well preserved on the left side of the animal. The following bones are known:—Femur, of larger size than the tibia and fibula; the latter two; two rows of tarsal bones (their proximal row consisting of two bones, tibiale and fibulare, and the distal one probably of five, of which only three are well preserved); four metatarsal bones and remains of four phalanges. The general disposition of these bones reminds us of *Palæohatteria*, according to the restoration thereof by McGregor.

The femur resembles that of *Trematops*, Williston, and *Eryops*, Cope. Diaphysis of the bone thin, trihedral; proximal and distal ends considerably widened and thickened, The proximal end more thickened on the inner side than on the outer one; the upper articular surface transversely

convex; on the outer side, posteriorly, there is a longitudinal depression; trochanter minor sharply defined, continuing into a stout crista aspera, of which the distal end is directed obliquely towards the upper margin of the fossa poplitea. On the distal end a sharply defined fossa poplitea and two lateral condyles.

The tibia and fibula are preserved in disturbed articulation; the tibia more normally disposed below the articular surface of the femur; the fibula removed upwards and lying beside the femoral condyle. The distal ends of the bones are abnormally crushed and spread out. It must be remembered that the whole limb is reversed. The two bones lie in the matrix and are therefore visible only from one side. Both of them are strongly developed, almost equal in length, though the tibia is more massive than the fibula.

The tibia resembles that of *Pareiasaurus* and *Labidosaurus*. In the middle part narrowed and compressed; trihedral in cross-section; proximal end much enlarged and thickened; distal end less expanded and weaker than the former; along the bone, on the outer side, a distinctly defined oblique crest; the proximal end with two articular surfaces for the articulation with the femur; distal end bent inwards and upwards for articulation with the tibiale.

The fibula is of nearly the same length as the tibia; narrowed in the middle part, trihedral, with proximal and distal ends enlarged; the hind inner surface flattened, the opposite surface convex.

The tarsalia are represented by two rows of bones, namely: in the proximal row the tetrahedral fibulare and transversely extended tibiale; in the distal row are preserved small bones II, III, IV, and there is a space for the bone V.

The metatarsalia are present in the II and V toes. These flat bones are constricted in the middle and slightly expanded proximally and distally; compressed vertically; gradually increasing in size from the II to the IV toe.

Phalanges of the toes are preserved as follows:—Of the II toe one phalange, of the III two; of the IV two or three; of the V one or two; the distal phalange of the IV toe tapers in the shape of a claw.

General Conclusions.—The restoration of *Seymouria* given by Williston in 1911 was based on the material at his disposal, whereby the missing tail was hypothetically figured as consisting of 18–19 vertebræ. In other respects this restoration and the skeleton of *Kollasia*, a form discovered in Russia, and close to *Seymouria*, are identical. Williston suggests that the food of *Seymouria* consisted of insects,

land-molluscs, and worms; to judge by the short and compressed shoulder, its extremities were adapted for crawling. Like the modern land-salamanders, *Seymouria*, in his opinion, was slow and sluggish in movement, hiding under fallen and decayed vegetation in low and damp places.

The skeleton of *Kotlassia* discovered in the North Dvina excavations, as well as the environmental conditions and the animal and plant remains found at the same place, confirm the opinion advanced by Williston. Nevertheless, the possibility of a more aquatic manner of life of the animal in question, as well its adaptation for swimming, are not excluded.

Systematic Position.—*Kotlassia* is closely allied to *Seymouria*, and may be included in the family of Seymouridae established by Williston. Bones not found in *Seymouria* and preserved in *Kotlassia* here described are on the pattern of the Cotylosaurians and Stegocephalians from Texas. The affinity with *Labidosaurus*, shown in the constitution of the pelvis and other bones, has been pointed out in the description.

Among specimens at hand two species may be distinguished, one of larger size, *Kotlassia prima*, and another of smaller size, *Kotlassia secunda*.

Kotlassia prima, sp. n.

The most nearly complete and largest skeleton among discovered specimens of *Kotlassia*. Served mainly to establish the generic characters. The more characteristic specific features are the rounded head, relatively small auricular depressions, and very strong ribs. Dimensions are given in the description of the generic characters.

Locality. Excavations at Sokolki.

Kotlassia secunda, sp. n.

Of smaller size than the preceding one. Badly preserved; several sacral vertebrae missing. The distinctive specific characters are the triangular head, strong vertebrae with thick spinous processes and short stout ribs, and stout pectoral girdle and pelvis. Sculpture distinctly developed, coarser, and with wider loops than in *K. prima*. Dimensions given in the description of the genus.

Locality. Excavations at Sokolki.

BIBLIOGRAPHY.

- BROILI, F. "Permische Stegocephalen und Reptilien aus Texas." Palaeont. bd. 51 (1904). (Full list of papers on Amphibians from the Permian.)
- WILLISTON, S. W. "A new Family of Reptiles from the Permian of New Mexico." Amer. Journ. Sci. vol. xxxi., May 1911, p. 391.
- . "Restoration of *Seymouria baylorensis*, Broili." Journ. Geol. vol. xix. 1911, pp. 232-36.
- . "New or little-known Permian Vertebrates." Journ. Geol. vol. xvii. 1909, p. 636.
- HUENE, FR. v. "The Skull-elements of the Permian Tetrapoda." Bull. Amer. Mus. Nat. Hist. vol. xxxii art. xviii. p. 315.
- . "Uebersicht uber die Reptilien der Trias." Palaeont. Abh. N. F. bd. xvi. heft 1 (1902).
- CASE, WILLISTON, and MEHL. Permo-Carboniferous Vertebrates from New Mexico. Washington, 1913.
- CASE, E. C. Revision of the Amphibia of the Permian of North America. Washington, 1911.

VII.—*On the Spiders of Spitsbergen. Results of the Merton College Expedition to Spitsbergen in 1923.*—No. 1. By A. RANDALL JACKSON.

MR. ELTON collected amongst other animals a number of spiders at Spitsbergen in 1923. These collections were made between July 26th and August 28th.

In all seven species were obtained in the adult state. These have all been obtained before, but a note on the fresh localities is interesting. The following is the list:—

Leptyphantes sobrius, Thor.

Wijde Bay. Three males and seven females adult. Also immature specimens from the same locality and a young female from Cape Thordsen.

Micryphantes nigripes, Sim.

A single adult female from Cape Thordsen.

No doubt, this is the same species as the specimen recorded in 'Avifauna Spitzbergensis' by Strand in 1911 as *M. fuscipalpis*, C. L. K. The characteristic arrangement of the eyes makes it almost certain that my identification is correct even in the absence of the male.

Hilaira glacialis, Thor.

Two females from Wijde Bay and two males from North Cape, North East Land.

Typhochrestus spetsbergensis, Thor.

This appears to be by far the commonest spider of Spitsbergen. Twelve males and twenty-six females were taken in the adult state, and the majority of the immature specimens are of this species. The following are the localities:—Liefde Bay, five males, nine females; Wijde Bay, three males, eight females; Cape Roos Liefde Bay, two females; Wahlenberg Bay Island, one female; mainland at north end of Bismarck Strait, in Huelopen Strait, two males, one female; North Cape North East Land, two males, five females.

Erigone tirolensis, L. K.

Three females at Cape Thørdsen.

Erigone psychrophila, Thor.

Liefde Bay, six males, eight females; Bock Bay, Lomme Bay, and Green Harbour, one female from each.

Erigone arctica, White.

Wijde Bay, three males, one female.

The females of *Erigone* are, of course, extremely difficult, and until this year I was not in the position of being quite sure of that of *E. psychrophila*. This closely resembles that of *E. tirolensis*, and I now feel certain that the two females obtained by Mr. Elton in 1921, and recorded by me as the latter, really belong to the former species, and that the specimens now recorded from Cape Thørdsen are the first I have seen from Spitsbergen of *E. tirolensis*, L. K.

The following is the summary of the adult specimens taken by Mr. Elton in 1923:—

Species.	Males.	Females.	Total.
<i>T. spetsbergensis</i> , Thor.	12	26	38
<i>E. psychrophila</i> , Thor.	6	11	17
<i>L. sobrius</i> , Thor.	3	7	10
<i>H. glacialis</i> , Thor.	2	2	4
<i>E. arctica</i> , White	3	1	4
<i>E. tirolensis</i> , L. K.	..	3	3
<i>M. nigripes</i> , Sim.	..	1	1
Total	26	51	77

Of the immature specimens it is impossible to say much. More than half are obviously *T. spetsbergensis*. There are seven young examples of *L. sobrius*. The rest, since there

are three species of *Erigone* in Spitsbergen, must be regarded as unidentifiable.

Coryphæus holmgreni, Thor.

The only spider known to inhabit Bear Island has not yet been found at Spitsbergen.

Micaria eltoni, Jackson, and *Leptyphantes hyperboreus*, Strand, are the two remaining species known to inhabit Spitsbergen. Neither was obtained by the present expedition.

VIII.—*Two new Mammals from East Africa.*

By P. S. KERSHAW.

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Rhynchogale caniceps, sp. n.

Type from a ravine on the outskirts of the Otto Estate, near Mbweni, about $2\frac{1}{2}$ miles west of Kilosa, Tanganyika Territory. Adult ♂. B.M. no. 23. 11. 15. 1. Original number 91. Collected by Mr. Arthur Loveridge, and presented to the British Museum by the Game Department of the Territory.

A grey-headed grizzled species, with peculiar upper posterior molars.

Head and cheeks grizzled white and brown, giving it a somewhat hoary appearance. Back and sides much more grizzled than in *melleri*, the buff rings of the hairs being very pronounced. The neck and shoulders a lighter greyer brown than the rest of the back. Towards the tail many of the hairs have long black tips. Underparts uniform clay-colour, except on chin and throat, which are grizzled. Legs dark brown, as in *melleri*. Tail-hairs cream-buff, with long black tips, the two colours contrasting noticeably.

Skull much swollen in the intertemporal region, the swelling affecting both frontal and parietal bones. Behind the swollen portion is a marked depression between it and the brain-case. This swelling is much more pronounced than in *melleri*. Bullæ more swollen than in *melleri*, both in the anterior and posterior portions. Last upper molars set askew in the tooth-line. In *melleri* a transverse line drawn

across the centre of one of these teeth would pass just in front of, or through, or just behind (not more than 1 mm.) the last molar opposite to it. In *caniceps* a similar line would pass 10·5 mm. behind the opposite tooth. (Skulls of *melleri* examined: the type and six others.)

Measurements:—

Head and body 460 mm.; tail 287; hind foot 95; ear 36.

Skull: greatest length 95; condylo-incisive length 91; basilar length 84; zygomatic breadth 48; least interorbital breadth 19; breadth from tip to tip of postorbital processes 35; least postorbital width 21; width of brain-case 32; bullæ 18 × 13 × 13; mandible, greatest length 68; number of upper premolars 4.

Hitherto this genus had held only one species, which inhabited Zambesia, from Angoniland in the north to Gorongosa in the south. Kilosa is some 500 miles N.N.E. of Angoniland. *Caniceps* is a well-marked species. It could at once be picked out by its head- and tail-markings alone, while the position of the last upper molars and the swelling on the top of the skull are its principal cranial distinctions.

Caught in a leopard-gin set by Game Department trappers.

Pronolagus crassicaudatus vallicola, subsp. n.

Type from the Rift Valley, Kenya Colony. Adult. B.M. no. 23. 5. 1. 1. Collected by the Game Warden of the Rift Valley, and presented to the British Museum by the Kenya Game Department.

Very similar in size and external appearance to *nyikæ*, the only differences being the following:—(1) fur much shorter and less dense than in *nyikæ*; (2) the wool-hairs of the back, instead of being pale slaty grey at the base, are pure pearl-grey; (3) these grey bases are short, being about equal in length to the buffy colour which follows, whereas in *nyikæ* much the greater part is grey, succeeded by a comparatively narrow ring of buffy; (4) exterior of ears darker and interior lighter than in *nyikæ*, so that a noticeable contrast is produced; (5) two narrow black lines, one from above the eye, the other from the base of the ear, run across the cheeks. These are not very conspicuous, but are entirely absent in *nyikæ*.

In the skull the anterior bases of the zygomata are not splayed out as in *nyikæ*, but are much compressed, more so even than in *curryi*, and terminate anteriorly in acute points, beneath which are found very distinct masseteric knobs. These knobs are no doubt a necessity owing to the compression of the shoulders of the zygomata. There is a faint

indication of them in *curryi*, but the skulls of all the other members of the genus which I have examined show no trace of them. Postorbital processes short and broad, as in *curryi*. Dentition weak compared with *nyikæ*. Palatal bridge somewhat longer. Nasals shorter.

Dimensions:—

Ear 56 mm. Others not available.

Skull: greatest length 80; basilar length 61; zygomatic breadth 39.5; nasals 36×17 ; interorbital breadth 15.5; intertemporal breadth 13.3; diastema 24.5; palatal foramina 22.3×8 ; palatal bridge 8.9.

While outwardly resembling *nyikæ*, this new form has some of the skull-characters of the South African *curryi*, but the general form of the skull, with its short rostrum and broad interorbital and intertemporal regions, is very different.

It is somewhat surprising to find this genus occurring far to the north of what has hitherto been considered its range. Except for *nyikæ*, of Nyasaland, all the other known members of the genus are from south of the Tropic of Capricorn.

The British Museum is indebted to Messrs. Clarke and Caldwell, of Nairobi, Game Wardens in the Game Department, for sending the skin and skull. Mr. Caldwell has kindly offered to try to secure further specimens from the locality.

IX.—*Some Cretaceous and Tertiary Decapod Crustaceans from Jamaica.* By THOMAS H. WITHERS, F.G.S.

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[Plates II.-IV.]

A GREAT number of fossil Decapod Crustaceans from the West Indies have been made known in a series of papers by Miss Mary J. Rathbun (1919-23), and in those papers reference to earlier work, which is surprisingly scanty, is given. So far as Jamaica is concerned, however, the only fossil Decapod yet known is the remarkably complete Upper Cretaceous crab *Carcineretes woolacotti*, Withers (1922).

Both in 1922 and 1923 Dr. C. T. Trechmann, F.G.S., made long stays in Jamaica, and from the Cretaceous and Tertiary Beds made extensive collections. The Decapod remains number twenty-four specimens, and these Dr. Trechmann has generously presented to the Geological Department of the British Museum.

From the Rudist Limestone (Upper Cretaceous) there are two examples of the crab *Carcinertes woolacotti*, one being an exceptionally complete male shell and the other merely an isolated propodus.

The remaining twenty-two Decapods are fragmentary and come from the Yellow Limestone (Eocene-Lutetian), and they are referable to the genera *Callianassa*, *Xanthilites*, *Callinectes*, and a form possibly like *Varuna*. These Eocene forms were found at two localities—Glasgow, S. of Lucea, and Spring Mount, S.E. of Montego Bay, in Western Jamaica. From Glasgow we have the species *Callianassa gigantea*, *Callinectes jamaicensis*, and *Xanthilites rathbunæ*, and from Spring Mount we have *Callianassa trechmanni*, *C. subplana*, parts of chela probably referable to *Xanthilites rathbunæ*, and a fragmentary merus possibly belonging to a form like the Grapsid crab *Varuna*. Species of *Callianassa* and *Callinectes* have been made known by Miss Rathbun (1919) from the West Indies, but no *Xanthilites*-like form has so far been described. Although admittedly fragmentary, these specimens represent all that is known of Jamaican Tertiary Decapods. Except in one instance none of them appear to be referable to known species, and perhaps this is not surprising since so little is known of West Indian Eocene Decapods.

The one exception is the propodus occurring with, and referred to, the carapace here described as *Xanthilites rathbunæ*. This propodus is apparently conspecific with that from the Middle Eocene (Plaisance limestone) of Haiti, described by Miss Rathbun (1923, Proc. U.S. Nat. Mus. vol. lxiii. art. 9, p. 3, pl. ii. figs. 6, 7) as ?*Xanthopsis* sp. It suggests that the Plaisance limestone of Haiti and the Yellow Limestone of Jamaica may be of the same age.

The age of the Yellow Limestone, from a study of the Mollusca, is considered by Dr. Trechmann (1923, "The Yellow Limestone of Jamaica and its Mollusca," Geol. Mag. vol. lx. p. 344) to be Eocene and probably Lutetian. Of the Yellow Limestone Decapods *Callianassa* ranges from Jurassic to Recent. *Callinectes* is known only from Miocene to Recent, so its occurrence in Eocene rocks extends its downward range. *Xanthilites*, however, is so far restricted to the Eocene, and, if our crab is correctly referred to that genus, it suggests a Middle Eocene age for the Yellow Limestone, a conclusion in conformity with the opinion of Dr. Trechmann.

Although it is agreed that the age of the Rudist Limestone of Jamaica is Upper Cretaceous, the particular stage

of the Upper Cretaceous represented by those beds is still a matter for discussion. In my paper on *Carcineretes woolacotti* (1922), the age, on the authority of Dr. Woolacott, was given as ?Turonian. Prof. Hawkins (1923, Geol. Mag. vol. lx. p. 215), from a study of the Echinoids, considers the whole sequence of Cretaceous beds to have a time-range from the base of the Upper Cretaceous to about the base of the Senonian. He further considers that one of the species of Echinoidea from the Rudist Limestone is either uppermost Turonian or lowest Senonian, an opinion not very different from Dr. Woolacott's. Prof. Hawkins is not inclined to consider that the Maestrichtian could be included in the sequence, although Dr. Trechmann (1922, Geol. Mag. vol. lix. p. 505; 1923, Geol. Mag. vol. lx. p. 345) is of the opinion that the whole series is probably Maestrichtian. The only Decapod known from the Rudist Limestone is the crab *Carcineretes woolacotti*, and this is an entirely new type, its family even being uncertain, and it is therefore of little use at present for stratigraphical considerations. It seems probable that more than one horizon is represented even by the Rudist Limestones, and examples of Crustacea are awaited with interest from the Cretaceous shales below, and from the *Burrettia*-limestone.

Order DECAPODA.

Suborder REPTANTIA.

Tribe ANOMOURA.

Superfamily THALASSINIDEA.

Family Callianassidae.

Genus CALLIANASSA, Leach.

The genus *Callianassa* ranges from the Lower Jurassic (Liassic) to Recent, and is represented by a great number of species. A list of the fossil species has been given by Bochin (1911), but since that date several species from the Tertiary of Panama, Peru, and the West Indies have been described by Miss Rathbun (1918, 1919) and by H. Woods (1922). Four of the species described by Miss Rathbun are from the Oligocene and Miocene of Anguilla and Santo Domingo respectively.

Callianassa trechmanni, sp. n. (Pl. II. figs. 1-8.)

Diagnosis.—A *Callianassa* with the upper and lower margins of the propodus almost parallel, a strong and

prominent tooth in the sinus between the fingers, and the distal end of the upper margin forming almost a right angle with the upper part of the margin of the articulation with the dactylus.

Distribution.—Eocene, Lutetian, Yellow Limestone (*Cerithium giganteum* and *Velates schmiedeliana* bed): Spring Mount, 6 miles S.E. of Montego Bay, West Jamaica.

Collection.—Collected by Dr. C. T. Trechmann, and presented to the Geological Department of the British Museum, registered In. 23002—In. 23012.

Holotype.—The left propodus (Pl. II. figs. 1, 2).

Material.—Eleven examples of the propodus with the immovable finger broken off. Two from the left side and one from the right are large, and have a height ranging from 24 to 24.5 mm. and a length* of from 27 to 28 mm. Eight, three from the left side and five from the right, are small, and range in height from 15.5 to 21 mm. and in length from 16.5 to 24 mm. These may represent respectively the propodus of the major and minor chelipeds.

Description.—Hand quadrate, almost rectangular in outline, the length slightly exceeding the height, upper and lower margins parallel. Upper margin slightly convex, almost straight, rather broadly rounded, but the inner edge for about half the length of the hand from the proximal end has a sharp raised ridge which dies out distally; lower margin almost straight, very slightly sinuous, sharp, and with a serrated edge. Outer surface moderately and almost uniformly convex, except near the base, where there is a slight concavity parallel to the lower margin, which is slightly raised to form a rim. On the inner side of this rim a row of from eight to ten small pits or sockets is seen in well-preserved specimens. A similar row of minute pits is present on both the outer and inner surface near the ridge on the upper margin. Three further almost equidistant pits form an oblique row on the inner surface, one pit being situated almost in the middle of the propodus, and the third pit situated a short distance from, and on a level with, the base of the articulation with the dactylus (see Pl. II. fig. 8); in some specimens the middle pit is nearer to the proximal pit, and in others it is nearer to the distal pit. Inner surface with the upper part and lower proximal portion convex, with a fairly deep concavity near the base of the immovable finger. Immediately below the base of the articulation with the dactylus there is a large

* The length in each case is measured from the articulation with the carpus to the articulation with the dactylus.

spine, which is wider than the sinus between the fingers. The outer surface of the spine is strongly convex and its inner surface flattened, and halfway from its base and towards its lower margin it bears a comparatively large blunt tubercle. A further blunt tubercle is situated on the outer surface of the hand, a little removed from the base of the spine.

Comparison with other Species.—This species may be compared with *Callianassa spinulosa*, Rathbun (1919, p. 143, pl. lxi. figs. 6–9), from the Oligocene of the Panama Canal zone. It agrees with *C. spinulosa* in having a tooth in the sinus between the fingers, but the tooth is much stronger. It further differs in having the upper and lower margins parallel instead of converging distally, and consequently the upper part of the distal margin at the articulation with the dactylus forms almost a right angle with the adjoining part of the upper margin. The lower margin is not so sinuous, and there are no scattered tubercles on the lower half of the outer surface.

Callianassa subplana, sp. n. (Pl. II. figs. 9–12.)

Diagnosis.—A *Callianassa* with the propodus subquadrate, the upper and lower margins subparallel, and with a strong blunt tubercle on the outer surface a little removed from the sinus between the fingers, and followed serially by three small tubercles, the middle one situated in the middle of the sinus between the fingers.

Distribution.—Eocene, Lutetian, Yellow Limestone (*Cerithium giganteum* and *Velates schmiedeliana* bed): Spring Mount, 6 miles S.E. of Montego Bay, West Jamaica.

Collection.—Collected by Dr. C. T. Trechmann, and presented to the Geological Department of the British Museum, registered In. 23013 and In. 23014.

Holotype.—The left propodus (Pl. II. figs. 9, 10).

Material.—Two examples of the propodus (one left and one right), with the immovable finger broken off. The right propodus has a height of 23 mm. and a length of 29.5 mm., and the left a height of 24.5 mm. and a length of 30.5 mm.

Description.—Hand subquadrate, the length well exceeding the height. Upper margin almost straight, comparatively narrowly rounded, but the inner edge for about two-thirds the length of the hand from the proximal end has a sharp raised ridge which dies out distally; lower margin straight, sharp, and serrated, but not markedly so at the proximal end. Outer surface almost uniformly convex, and a little removed from the sinus between the fingers is

a broad flat tubercle, and this is followed by three small equidistant tubercles, the middle one being situated midway between the fingers and the next on the inner side of the sinus, although this latter tubercle is unequally developed in the two specimens. A little removed from, and parallel to, the lower margin is a row of small pits; four or five can be seen towards the distal end of the holotype, but there were probably eight to ten in all. Traces of minute pits can be seen in the paratype on each side of the ridge on the upper margin, and there were probably two rows. Inner surface with upper part and lower proximal portion convex, with a deep concavity at the base near to the base of the immovable finger; in this concavity, arranged in two irregular lines, are twelve slight tubercles. An oblique row of three or more pits is seen on the inner surface, the proximal pit being situated near the middle of the propodus, and the last pit situated a short distance from, but well above the base of, the articulation with the dactylus.

Comparison with other Species.—This species is close to *Callianassa quadrata*, Rathbun (1919, p. 145, pl. lxii. figs. 4–14), from the Oligocene of the Panama Canal zone, but it differs from the holotype in the upper margin being straighter, and the proximal corner of the propodus is much more rectangular. Although it agrees in having a strong tubercle on the outer surface, a little removed from the sinus between the fingers, it has three further equidistant tubercles extending serially down the sinus.

Callianassa gigantea, sp. n. (Pl. II. figs. 13, 14.)

Diagnosis.—A *Callianassa* with the propodus quadrate, the proximal ends of the upper and lower margins rounded off extremely slightly, with a deep depression near and leading to the sinus between the fingers, and the sinus comparatively narrow; inner surface comparatively gently convex.

Distribution.—Eocene, Lutetian, Yellow Limestone (*Cerithium giganteum* and *Velates schmiedeliana* bed): Glasgow, about 8 miles S. of Lucea, West Jamaica.

Collection.—Collected by Dr. C. T. Trechmann, and presented to the Geological Department of the British Museum, registered In. 23015.

Material.—A single right propodus (holotype, Pl. II. figs. 13, 14) with the immovable finger broken off. Height 30 mm., length about 33 mm.

Description.—Hand comparatively large, quadrate, almost rectangular in outline, the length slightly exceeding the height. Upper and lower margins almost parallel, the upper margin slightly convex, rather broadly rounded, but the inner edge for two-thirds the length of the hand from the proximal end has a sharp raised ridge which dies out distally; lower margin straight, sharp, and serrated, especially near the proximal end. Outer surface almost uniformly convex, but with a rather abrupt, deep, and wide sulcus near and leading to the sinus between the fingers; inner surface with the middle and upper portions gently convex, and the lower portion, parallel to the lower margin, concave. Sinus between fingers narrow.

Comparison with other Species.—*Callinassa gigantea* may be compared with *C. quadrata*, Rathbun (1919, p. 145, pl. lxii. figs. 4–14), although the propodus is more quadrate in shape than in that species, since the lower and upper proximal corners are not so much rounded off. Its inner surface is not so convex, the sinus between the fingers is much narrower, and the depression leading to the sinus is deeper and more defined.

C. gigantea probably had a tooth between the fingers as in *C. trechmanni*, and, although the holotype is larger, it much resembles *C. trechmanni*. The wide and comparatively deep sulcus leading to the sinus between the fingers, and the absence of a strong tubercle in a similar position to that on the outer surface at the base of the tooth in *C. trechmanni*, renders it necessary at present to keep these two forms apart.

Tribe BRACHYURA.

Subtribe BRACHYGNATHA.

Superfamily BRACHYRHYNCHA.

Family Portunidae.

Genus CALLINECTES, Stimpson.

Callinectes jamaicensis, sp. n. (Pl. III. figs. 7, 8.)

Diagnosis.—A *Callinectes* with the propodus having seven facets, the uppermost facet depressed and inclined downwards towards the inner surface; lower margin sinuous, concave towards the base of the immovable finger; a small but conspicuous rounded tubercle situated on the inner surface near to the middle of the articulation with the dactylus.

Distribution.—Eocene, Lutetian, Yellow Limestone (*Cerithium giganteum* and *Velates schmiedeliana* bed): Glasgow, about 8 miles S. of Lucea, West Jamaica.

Collection.—Collected by Dr. C. T. Trechmann, and presented to the Geological Department of the British Museum, registered In. 28016.

Material.—The propodus of a left cheliped with the immovable finger broken off (holotype, Pl. II. figs. 7, 8). Height 13 mm., length 19.5 mm.

Description.—Propodus with the upper margin almost straight, and the lower margin sinuous, the two margins being almost parallel; prismatic, with seven facets, more or less distinct, four on the outer and three on the inner surface. The whole surface is covered with fine punctæ, which often occur in small close groups of two to four. Facets separated by bluntly rounded ridges. On the outer surface the uppermost facet is somewhat concave, is bounded above by the strongly ridged upper margin, and below by an ill-defined ridge, which ends at the base of a node at the middle of the articulation with the dactylus; the next facet is situated a little above the middle, and its lower line is a very strongly raised and rounded ridge which dies out before reaching the sinus between the fingers; the third facet is the widest, and is bounded below by a strong ridge near and parallel to the basal margin, and the ridge is continued on to the immovable finger; the fourth facet is very narrow, is sharply and obliquely inclined to the lower margin. On the inner surface the upper facet is very narrow, somewhat concave, is only very slightly inclined towards the outer surface, and is bounded above by the strongly ridged upper margin of the outer surface and below by a second strong ridge; the two remaining facets are almost equal in width, and are divided off by a very strongly raised ridge extending down the middle, and dying out near the sinus between the fingers; a small but conspicuous rounded tubercle is situated a little from the edge of the middle of the articulation with the dactylus.

Comparison with other Species.—This propodus may be compared with *Callinectes declivis*, Rathbun (1919, p. 162, pl. lxvi. figs. 1-3), and *C. reticulatus*, Rathbun (1919, p. 163, pl. lxvi. figs. 5-7), from the Miocene of Costa Rica and the Oligocene of the Panama Canal zone respectively. *C. declivis* has been also recorded from the Lower Miocene of Santo Domingo (Rathbun, 1919, p. 174, pl. ix. figs. 1, 2). The present propodus seems to agree especially well with *C. declivis* in its general characters and in the position of

the upper facet on its inner face, although in the present species it is less inclined and is depressed, the ridges on either side being more prominent. It differs also in the absence of any trace of a groove on the inner surface extending from the base of the immovable finger, and the lower margin of the propodus is distinctly concave towards the base of the immovable finger.

Family Xanthidae.

Genus XANTHILITES, T. Bell.

Xanthilites rathbunæ, sp. n.

(Pl. III. figs. 1-6 ; Pl. IV. figs. 5, 6.)

Diagnosis.—A Xanthid crab with a carapace like *Xanthilites bowerbanki*, but with the front much more deflected, the epigastric lobes more prominently developed, and the channel separating the orbit from the front wider and deeper.

Distribution.—Eocene, Lutetian, Yellow Limestone (*Cerithium giganteum* and *Velates schmiedeliana* bed): Glasgow, about 8 miles S. of Lucea, West Jamaica, and Spring Mount, 6 miles S.E. of Montego Bay, West Jamaica.

Collection.—Collected by Dr. C. T. Trechmann, and presented to the Geological Department of the British Museum, registered In. 23017-In. 23022.

Holotype.—The fragmentary carapace (Pl. III. figs. 1, 2).

Material.—Part of a carapace from Glasgow showing the front, left orbit, and little more than the gastric region; two examples of the propodus from Spring Mount, possibly representing a right major and a right minor cheliped, and three fragmentary fingers. These were all found apart from one another, and, even if they do prove to belong to the same species, represent at least three individuals. The larger propodus has a height of 26 mm. and a length of 34 mm., and the smaller propodus a height of 21 mm. and a length of 31 mm.

Description.—Carapace considerably deflected downwards towards the front, and the furrows between the various regions well marked. Front somewhat projecting, with a sharp median emargination, and on each side is folded into two lobes, which are covered with several slight tubercles. Orbital region separated from the front by a conspicuous deeply-cut furrow, and there is a similar furrow, although not nearly so deeply cut or so well-marked, on the posterior margin of the orbit. Epigastric lobes rather large, forming

rounded and prominent bosses, fairly distinctly marked off behind from the protogastric lobes, which are large and flatly rounded. Gastric region marked off by a deep depression from the branchial regions.

Propodus comparatively short and stout, with the distal end almost straight, and the proximal end very oblique. Outer surface almost entirely ornamented, strongly convex longitudinally, and a little less strongly horizontally. Inner surface generally somewhat flattened, but much humped in the middle, and there is a deep depression extending round and close to the articulation with the carpus. A strong blunt spine is developed at the proximal end of both the upper and lower margins, but that at the lower margin is stronger and more produced. Upper and lower margins slightly convex, the lower margin obliquely inclined towards the proximal end, and both margins are almost equally and somewhat broadly rounded.

Measurements.—Length of complete propodus: upper margin 28.5 mm., lower margin 35 mm. Height 26.1 mm., thickness 15.7 mm.

Comparison with other Species.—This is obviously a Xanthid crab, and, so far as one can judge from what we have of the carapace, it either belongs, or is nearly related to, the genus *Xanthilites*, Bell. The genotype is *Xanthilites bowerbanki*, Bell (1857, p. 17, pl. ii. figs. 2–6), from the London Clay (Ypresian) of Sheppey. While the present species seems to agree with it in the disposition of the several lobes and the presence of a channel on either side of the orbit, the epigastric lobes are much more prominent, the channel on the anterior side of the orbit is much wider and deeper, and the carapace more deflected in front. The propodus is apparently the same as that from the Middle Eocene (Plaisance limestone) of Haiti, described by Miss Rathbun (1923, Proc. U.S. Nat. Mus. vol. lxiii. art. 9, p. 3, pl. vii. figs. 6, 7) as ? *Xanthopsis* sp.

Family Grapsidae.

Genus ? VARUNA. (Pl. IV. fig. 7.)

This specimen evidently represents the lower and a part of the outer surface of a left merus resembling that of certain forms included in the family Grapsidae, but it appears to agree more closely with the genus *Varuna*.

The inner side of the specimen is broken away, but the outer side is divided almost equally by a sharp ridge extending midway between the upper and lower margins.

The outer surface is convex and slopes steeply towards its lower margin. The lower surface is somewhat flattened, the inner distal corner being outwardly bent. The upper margin is convex and inwardly rounded. The inner margin is slightly concave at the proximal corner, the remaining two-thirds being convex, with six, or may be seven, small irregular teeth, the two proximal teeth being smaller than the others. A little removed from this margin, and parallel to it, is a single row of closely arranged small tubercles, and between these and the toothed margin are a few unequal tubercles. Outside the row of tubercles the surface is indistinctly and irregularly tuberculated.

Distribution.—Eocene, Lutetian, Yellow Limestone (*Cerithium giganteum* and *Velates schmiedeliana* bed): Spring Mount, 6 miles S.E. of Montego Bay, West Jamaica.

Collection.—Collected by Dr. C. T. Trechmann, and presented to the Geological Department of the British Museum, registered In. 23023.

Family ? Cymopoliidae.

Carcineretes woolacotti, Withers. (Pl. IV. figs. 1-4)

1922. *C. woolacotti*, Withers, Ann. & Mag. Nat. Hist. ser. 9, vol. x. p. 535, pl. xvi. fig. 1, pl. xvii. figs. 2-6.

The type-material of this species consists of three specimens embedded in Grey Calcareous Shale (Upper Cretaceous, ?Turonian) from the bed of the Rio Minho, a little to the west of Trout Hall, Chapelon, Central Jamaica. Of the two shells, one (the holotype) has four ambulatory appendages and the two chelipeds, and the other has only the right minor chela preserved of the appendages. The third specimen consists of an isolated major chela. Both carapaces showed the under surface, although in each case it was incompletely preserved, and both were considered to be males.

Dr. Trechmann has collected from towards the top of the Rudist limestone section at Logie Green, on the Rio Minho, about 5 miles W. of Trout Hall, N.W. of Chapelon, Central Jamaica, a further example of this species. The specimen was associated with examples of the genus *Hippurites*, and represents a carapace (Pl. IV. figs. 1, 2) a little larger than either the holotype or paratype, for it has a length of 41 mm. and a breadth of 46 mm. Now that the matrix has been removed, the under surface is seen to be more complete than is the type-material. The sternal plates are particularly well preserved, since only the proximal plate on the

left side is missing, but the abdomen has the last three plates only preserved. The abdominal plates agree with those of the paratype carapace, and it seems certain now that, while both these are males, the holotype is not a male but a young female, for the abdominal plates are relatively wider, although not nearly so wide as is usual in a female crab.

Unfortunately, the antennal and epistomial regions are not preserved, for efforts were particularly directed towards clearing the matrix from the neighbourhood of these parts, and, although the third maxillipeds are preserved, only those portions can be seen that are not covered by the chelæ.

From Logie Green there is also a small but well-preserved propodus belonging to this species, and evidently representing a minor chela. It shows the characters much better than can be seen in the other specimens, since it is entirely free from matrix (Pl. IV. figs. 3, 4).

In conclusion, I wish to express my indebtedness to Miss Mary J. Rathbun, of the United States National Museum, for kindly comparing some of the specimens here described with certain of her types from the Oligocene of the Panama Canal zone.

EXPLANATION OF THE PLATES.

PLATE II.

Callianassa trechmanni, sp. n.

- Fig.* 1. Left propodus. Outer view. Holotype. In. 23002.
Fig. 2. Inner view of same.
Fig. 3. Right propodus. Outer view. In. 23003.
Fig. 4. Inner view of same.
Fig. 5. Right propodus. Outer view. In. 23004.
Fig. 6. Inner view of same.
Fig. 7. Left propodus. Outer view. In. 23005.
Fig. 8. Inner view of same.

Callianassa subplana, sp. n.

- Fig.* 9. Left propodus. Outer view. Holotype. In. 23013.
Fig. 10. Inner view of same.
Fig. 11. Right propodus. Outer view. In. 23014.
Fig. 12. Inner view of same.

Callianassa gigantea, sp. n.

- Fig.* 13. Right propodus. Outer view. Holotype. In. 23015.
Fig. 14. Inner view of same.

All figs. nat. size.

PLATE III.

Xanthilites rathbunæ, sp. n.

- Fig.* 1. Part of carapace. Outer view. Holotype. In. 23017.
Fig. 2. Front view of same.

Fig. 3. Imperfect propodus of possibly a right minor cheliped belonging to this species. Outer view. In. 23018.

Fig. 4. Inner view of same.

Fig. 5. Propodus of possibly a right major cheliped belonging to this species. Outer view. In. 23019.

Fig. 6. Inner view of same.

Callinectes jamaicensis, sp. n.

Fig. 7. Left propodus. Outer view. Holotype. In. 23016.

Fig. 8. Inner view of same.

Figs. 1 & 2, 7 & 8, $\times 1.5$ diam.; figs. 3-6, nat. size.

PLATE IV.

Carcineretes woolacotti, Withers.

Fig. 1. Dorsal view of a male shell. In. 23000.

Fig. 2. Abdominal view of same.

Fig. 3. Outer view of propodus evidently belonging to a minor chela. In. 23001.

Fig. 4. Inner view of same.

Xanthilites rathbunæ, sp. n.

Fig. 5. Outer view of finger probably belonging to this species. In. 23020.

Fig. 6. Outer view of another specimen. In. 23021.

? *Varuna* sp.

Fig. 7. Lower outer view of merus belonging to a form like *Varuna*. In. 23023.

Figs. 1 & 2, nat. size; figs. 2-7, $\times 2$ diam.

REFERENCES.

- BOEHM, J. 1911. "*Callianassa burckhardti*, n. sp., nebst einer Zusammenstellung der fossilen Arten der Gattung *Callianassa*." Monatsb. Deutsch. Geol. Gesell., Bd. lxiii. pp. 37-46.
- BOEHM, J. 1911. "Nachtrag zu *Callianassa burckhardti*." Zeitsch. Deutsch. Geol. Gesell., Bd. lxiii. p. 246.
- RATHBUN, M. J. 1919. "Contributions to the Geology and Paleontology of the Canal Zone, Panama, and geologically related Areas in Central America and the West Indies. Decapod Crustaceans from the Panama Regions." Bull. 103, U.S. Nat. Mus. (1918), pp. 123-184, pls. liv.-lxvi.
- RATHBUN, M. J. 1919. "West Indian Tertiary Decapod Crustaceans." Publ. 291, Carnegie Inst. Washington, pp. 157-184, 9 pls.
- RATHBUN, M. J. 1920. "Additions to West Indian Tertiary Decapod Crustaceans." Proc. U.S. Nat. Mus. vol. lviii. pp. 381-384, pl. xxv.
- RATHBUN, M. J. 1923. "Fossil Crabs from the Republic of Haiti." Proc. U.S. Nat. Mus. vol. lxiii. pp. 1-6, pls. i, ii.
- WITHERS, T. H. 1922. "On a new Brachyurous Crustacean from the Upper Cretaceous of Jamaica." Ann. & Mag. Nat. Hist. ser. 9, vol. x. pp. 534-541, pls. xvi., xvii.
- WOODS, H., and others. 1922 (April). 'Illustrations of the Tertiary Fossils of Peru.' 8vo. London. 24 pls. (These plates were later published in T. O. Bosworth's Geol. & Palæont. of N.W. Peru. London, 1922.)
- WOODS, H. 1922. "Crustacea from the Eocene Deposits of Peru," pp. 114-118, pl. xvii. In T. O. Bosworth's Geol. & Palæont. North-West Peru. 8vo. London, 1922.

X.—*Eocene Brachyurous Decapod Crustaceans from Nigeria.* By THOMAS H. WITHERS, F.G.S.

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[Plate V.]

AMONG the Invertebrates from Nigeria presented in 1917 to the Geological Department of the British Museum by Mr. A. E. Kitson and Mr. W. Heward Bell are several Decapod remains. They were collected from Railway Cuttings (numbered 1 and 6) at Ameki, in the district of Omobialla, on the Eastern Railway, Southern Nigeria. From Cutting No. 6 the remains consist only of fragmentary fingers of crabs, evidently belonging to several forms, but insufficiently complete to serve at present any useful purpose. From Cutting No. 1 there is an incomplete propodus of a crab, equally unserviceable, but there is also a well-preserved carapace of a most interesting crab and an incomplete cheliped belonging to another type, and these two specimens form the subject of this paper.

References to the few palæontological papers on this area are given in a most important work by R. Bullen Newton on the Eocene Mollusca from Nigeria, published in 1922 as Bull. No. 3 of the Geological Survey of Nigeria. From a study of the mollusca the beds are considered by Mr. Newton to be of Middle Eocene (Lutetian) age, and this is in accord with the evidence, so far as it goes, of the crabs here described.

Family Xanthidæ.

*Holcocarcinus** *sulcatus*, gen. et sp. n. (Pl. V. figs. 1, 2.)

Diagnosis.—A Xanthid crab with the carapace transversely oval, not marked off into regions, and with two prominent subparallel transverse ridges, with a wide groove or furrow between, extending across the middle of the carapace; front divided into two wide lobes by a slight median emargination; antero-lateral margins not toothed; postero-lateral margins converging rapidly posteriorly.

Distribution.—Middle Eocene: Railway Cutting No. 1, near Ameki, Southern Nigeria.

Collection.—Geological Department of the British Museum (presented by A. E. Kitson and W. Heward Bell), registered in. 18455.

* δαλός = furrow; καρκίνος = crab.

Holotype.—The only known carapace (Pl. V. figs. 1, 2).

Description.—Carapace transversely oval, length 10 mm., breadth 17.2 mm., convex longitudinally, not marked off into regions, with two sharp and prominent transverse ridges, the lower ridge convex with the convexity downwards and situated about one-fifth the length of the carapace from the posterior margin, and the upper ridge almost straight and situated about two-fifths the length of the carapace from the front, or midway between the lower ridge and the front. The carapace is comparatively deeply concave between the two ridges, forming a wide furrow; the surface slopes gently from the anterior ridge towards the front, and from the posterior ridge to the margin it slopes rapidly. Outer surface uniformly ornamented with fine pits, the interspaces being exceedingly finely granulated.

Front convex, not markedly protuberant, about one-fourth the breadth of the carapace, divided into two wide lobes by a slight median emargination. Orbits broadly rounded, comparatively wide, bounded on the outside by a slight rounded orbital tooth; the eye-stalks are partly preserved. Antero-lateral margins regularly convex, not marked off into lobes or teeth. Upper part of postero-lateral margins, between the two transverse ridges, almost straight, converging slightly posteriorly, the lower postero-lateral margins almost straight, and converging rapidly towards the posterior margin. Posterior margin very slightly convex, with the postero-lateral angles angularly rounded.

Ventral surface crushed into the inside of the carapace, in consequence of which the details of structure are not clearly shown. Three of the abdominal segments only are preserved; they are broad and narrow, probably indicating that the carapace is that of a young female. Sternal plates only clearly seen on the left side (Pl. V. fig. 2), and on the right side the elongate joints (merus) of two of the walking appendages are shown. On each side the pterygostomial plate is displaced; it is concave and widely hollowed out below, evidently indicating that this crab had comparatively massive chelipeds, and the upper margin of the bevel is distinctly but minutely beaded. Antennal and epistomial regions well preserved (Pl. V. fig. 2).

Remarks.—This Nigerian crab appears to be quite distinct from any described form, but it comes nearest to a crab from the Middle Eocene of Kressenberg, Bavaria, described by Lörenthey (1898, Természet. Füzetek., Ann. Mus. Nat. Hungar. Bd. xxi. p. 138, pl. x. figs. 1a-1d) as *Carinocarcinus zitteli*, gen. et sp. n. *C. zitteli* differs, however, in the

front being straight instead of rounded, and there is no median emargination. The antero-lateral margins are thrown into three lobes or teeth; only a single transverse ridge is present, and this is situated in a similar position to the anterior ridge in the Nigerian crab; and the postero-lateral margins are much less straight and less convergent. In view of these differences of structure, this Nigerian form cannot be included in the genus *Carinocarcinus*, but must form the type of a new genus, *Holcocarcinus*. Its most peculiar character is the posterior of the two strong transverse ridges extending across the carapace.

Family Xanthidae.

Gen. et sp. indet. (Pl. V. figs. 3, 4.)

The interest of this large cheliped lies in its stratigraphical association with *Holcocarcinus sulcatus*. The type of *H. sulcatus* is a carapace which probably represents that of a young female, and it must have had comparatively massive chelipeds, but it does not seem possible that they could have attained the size of this cheliped. The specimen cannot be identified with any genus known to me, and in the circumstances it seems advisable not to give it a name, but rather to await further material, more especially the carapace.

Distribution.—Middle Eocene: Railway Cutting No. 1, near Ameki, Southern Nigeria.

Collection.—Geological Department of the British Museum (presented by A. E. Kitson and W. Heward Bell), registered ln. 18454.

Material.—An incomplete left (? minor) cheliped, comprising the carpus, and the propodus with part of the immovable finger broken off.

Description.—Carpus elongate, thick and rounded, with its inner angle produced into a strong and prominent spine, situated slightly nearer to, and directed towards, the inner face of the propodus.

Propodus comparatively long and stout, height 22 mm., length 38 mm., thickness 15.5 mm., with the distal end slightly oblique, and the proximal end very oblique. Outer face strongly convex longitudinally, and entirely ornamented with extremely fine and exceptionally close granules, and with squarish and rounded groups of whitish and somewhat tear-shaped markings. Inner face concave near and parallel with the upper margin, and below this concavity the face is much humped. A strong rounded spine is formed at the

proximal end of both the upper and lower margins, but that at the lower margin is very much stronger and produced. Upper and lower margins subparallel, slightly converging proximally, upper margin convex, broadly rounded, somewhat flattened, with an obscure ridge on its outer and inner edge; lower margin slightly sinuous and comparatively sharply rounded. The teeth on the immovable finger are rather small and somewhat sharp-edged. On both the outer and inner faces, at the middle of the articulation with the dactylus, a rounded and produced lobe is formed.

Remarks.—This cheliped evidently belongs to a Xanthid crab, and its chief features appear to be that the propodus is comparatively long in proportion to its height, being about $1\frac{1}{4}$ times as long as high, the surface is devoid of spines or ridges, and the inner face is very much humped below the middle.

The preservation of this cheliped and of the carapace described as *Holcocarcinus sulcatus* serves to show that more detailed and careful collecting would bring to light in Nigeria a comprehensive Eocene crab fauna, especially since the fragmentary fingers, which I do not venture to describe, indicate several types of Brachyura.

EXPLANATION OF PLATE V.

Holcocarcinus sulcatus, gen. et sp. n.

Fig. 1. Carapace, ♀. Dorsal view. $\times 4$.

Fig. 2. Ventral view of same.

Family Xanthidæ, gen. et sp. indet.

Fig. 3. Propodus and carpus of left (? minor) cheliped. Outer view. $\times 1.5$ diam.

Fig. 4. Inner face of same.

XI.—New Indo-Australian Noctuidæ.

By the Rev. G. HULSTAERT, M.S.C.

THE types and other specimens mentioned in this paper are all in our collection at Heverlee.

I have to express my thanks to Mr. G. Talbot, Mr. W. H. T. Tams, and Miss A. E. Prout for kindly giving me their opinion on many of the species described below and comparing some of them with specimens in their respective museums. I have to thank also the Rev. A. Adriaanse, M.S.C., for sending me the specimens mentioned as "in coll. Arnh."

*HADENINÆ.**Sideridis codyi*, sp. n.

♂. Fore wing: costa slightly curved, apex somewhat acute, the termen straight to vein 4, then bowed and oblique to tornus; below with rough hair in cell.

Abdomen and legs smooth.

Brownish grey, antennæ whitish towards base; thorax paler dirty grey; abdomen somewhat tinged with yellow; pectus more whitish; legs somewhat fuscous.

Fore wing pale greyish brown, closely and finely striated, and with many minute fuscous dots, especially in terminal half; two minute dark points at end of cell; a white point at its lower angle with a small fuscous-grey patch beyond it; a very faint shade of greyish scales from apex oblique to vein 4 or 3; minute black points before termen between the veins; cilia greyish with a pale line at base.

Hind wing semihyaline dirty greyish white, termen rather broadly fuscous black; cilia whitish.

Below.—Fore wing: ochreous, tinged with pink in apical part of costa; inner area feebly silvery whitish; a faint fuscous subterminal patch between vein 5 and submedian fold; median nervure and veins 2-5 black; black points before termen; terminal area mottled with fuscous grey; cilia ochreous brown mottled with grey. Hind wing similar to above, but more pure white, costa pale ochreous with some grey scales; inner margin yellow.

Expanse.—42 mm.

1 ♂, Douglas Park, N.S.W., Australia (Rev. G. Cody, M.S.C.).

Resembling *vibicosa*, Turn., but, supposing Dr. Turner's description complete, distinct by the presence of pale and black spots at lower angle of cell on fore wing, etc.

*ACRONYCTINÆ.**Acrapex postrosea*, sp. n.

♀. Pale ochreous irrorated with grey; abdomen whitish beneath. Fore wing strongly irrorated with grey scales; a black point in middle of cell and at its lower angle; an oblique series of black points on the veins from apex to vein 1 below angle of cell, with a very indistinct greyer suffusion beyond it at apex; black points before termen. Hind wing rosy, whitish at costa; heavy black points before termen; cilia whitish.

Below.—Fore wing vinous rosy, ochreous at costa and termen; black terminal points; cilia ochreous. Hind wing yellowish white, a slight vinous-rosy suffusion at apex and termen; black terminal points smaller than above.

Expanse.—32 mm.

1 ♀, Merauke, Dutch New Guinea (Rev. P. Vertenten, M.S.C.).

ERASTRIINÆ.

Cerynea pilipalpus, sp. n.

♂. Patagia with a tuft of hair from upper edge produced over base of abdomen. All coxæ clothed with woolly hair; fore femora with extremely long flocculent hair; fore and mid tibiæ* fringed with hair above, the former with a groove containing a tuft of very long ochreous hair (longer than tibiæ themselves). Palpi straightly upturned, 1st joint with very long blackish hair beneath, the 2nd broadly scaled in front and slightly fringed with hair behind towards tip; the 3rd rather short, rather roughly scaled.

Head, antennæ, 2nd and 3rd joints of palpi, thorax, dorsal surface of abdomen, and legs brownish black, strongly tinged with olive-yellow; tarsi black, ringed with pale; pectus, abdomen ventrally (except dark anal tuft), and woolly hair of legs whitish. Above: wings brownish black, closely irrorated with olive-yellow. Fore wing with many whitish costal points, especially at the lines, which are all rather indistinct; subbasal line pale; antemedial line blackish, slightly waved, excurved below costa to below cell, then inwardly oblique, basally defined by yellowish white; a pale ring with black centre beyond it in cell; reniform with blackish outline, constricted at middle, its outer edge defined by pale; no traces of a medial line; postmedial line double, the inner blackish, more or less interrupted, the outer formed by a series of white points at the veins, excurved below costa, then oblique and almost straight; subterminal line yellowish, sinuous, incurved at submedian fold; a fine black terminal line with blackish points on it at the interspaces. Cilia chequered brownish black and olive-yellow, with white interspacial points at the base.

Hind wing: traces of pale antemedial and medial lines, a fine blackish stripe on discocellulars, a double sinuous postmedial line excurved at middle, the inner formed by black points, the outer by whitish ones, a feebly sinuous

* Hind legs wanting, unfortunately.

yellowish subterminal line ; a black terminal line with dark points on it in the interspaces ; cilia as on fore wing.

Below.—Pale greyish ; base of both wings and some points at costa of fore wing ochreous ; a stripe on discocellulars ; pale fuscous medial, postmedial, and subterminal lines ; a blackish line at termen. On hind wing a fuscous oval discocellular marking ; lines fuscous ; medial one excurved at veins 7 and 6, incurved below cell, touching discocellular marking ; postmedial excurved at veins 7 and 6, and 4 and 3, dentate basally at discal and submedian folds ; subterminal line inwardly diffused, incurved below costa and at submedian fold, outcurved at median fold, ending near tornus ; a fine black terminal line.

Expanse.—24 mm.

1 ♂, Merauke (Dutch New Guinea), in coll. Arnh.*.

Completely different from any species known to me by the formation and clothing of legs and palpi.

MEIZOGLOSSA, gen. nov.

Proboscis developed ; palpi obliquely upturned, the 2nd joint reaching about to middle of frons, rather broadly scaled below and fringed with hair above towards extremity, the 3rd moderate ; thorax clothed almost entirely with scales, without crests ; abdomen with depressed crest on basal segment. Fore wing with the apex rounded, the termen evenly curved and not crenulate ; veins 3, 5 from near angle, at equal distance ; 6 from below upper angle ; 7, 8, 9 stalked ; 10, 11 stalked. Hind wing with veins 3, 4 shortly stalked, 5 from below middle of discocellulars nearly fully developed ; 6, 7 from upper angle, 8 anastomosing with cell near base only.

Closely allied to *Ligidia*, Wlk., but different by the fully developed proboscis, the broader scaled 2nd joint of palpi, the basal crest of abdomen.

Genotype, *M. bipunctata*, sp. n.

Meizoglossa bipunctata, sp. n.

♂. Grey. Fore wing above more or less striated with brown ; antemedial and medial lines brown, the latter forming a brownish patch in end of cell ; two black points on discocellulars ; postmedial line double, the inner brown, indistinct in lower half, the outer white, excurved beyond

* By these words is meant, here and further on, that the specimen thus mentioned belongs to the collection of the Missionaries of the Sacred Heart at Arnhem (Holland).

cell, then oblique and incurved; subterminal area darker with a pale line, incurved on veins 6, 5 and on submedian fold, strongly excurved below vein 4. Hind wing grey, paler at base.

Underside of fore wing dark grey, of hind wing whitish; the latter with a black discoidal lunule and a faint subterminal line; both wings with blackish points at termen.

Expanse.—20 mm.

1 ♂, Olilit (Jamdena), Tenimber (Rev. D. van Roessel, M.S.C.).

Amyna aroa, B.-Bak.

Ilattia aroa, Bethune-Baker, Nov. Zool. xiii. p. 199 (1906).

1 ♀, Olilit, Jamdena (Rev. D. van Roessel).

Amyna octo, Guen.

Perigea octo, Guenée, Noct. i. p. 233 (1852).

1 ♂, Olilit, Tenimber (Rev. D. van Roessel).

Amyna punctum, Fabr.

Noctua punctum, Fabricius, Ent. Syst. iii. 2, p. 34 (1794); ab. *annulata*, Fabr. *ibid.* p. 47.

1 ♂, Olilit, Tenimber (Rev. D. van Roessel).

Cretonia brevioripalpus, sp. n.

Extremely resembling *C. vegeta*, Swinh., but easily distinguished by the much shorter palpi.

♂. Palpi with the 2nd joint fringed as in *vegeta*, but much shorter, not reaching vertex of head, the 3rd acuminate, about as long as the 2nd. Head, thorax, pectus, legs, abdomen, palpi, and antennæ coloured as in *vegeta*.

Fore wing glossy red-brown; a very fine subbasal line oblique below costa, incurved from costal nervure to submedian fold, then outwardly oblique to inner margin; antemedial line dark brown, defined on inner side by pale, oblique slightly incurved at middle, with an outwardly diffused darker red-brown band beyond it, which is broadest in and below middle; medial line dark grey, oblique, outcurved from below costa to submedian fold, the reniform a pale round spot on it; postmedial line slight, oblique from costa, excurved to vein 6, from vein 5 to submedian fold, and above inner margin, incurved at the folds, minutely dentate on and above vein 2; subterminal line grey, broad, diffused, obliquely incurved to discal fold, then outwardly oblique to vein 4 and erect to inner margin. Hind wing

grey suffused with fuscous. Underside grey suffused with fuscous; fore wing with terminal area paler, some whitish points on costa before apex, a faint postmedial line, outwardly defined by pale, oblique below costa, then straight.

Expanse.—23 mm.

1 ♀, Olilit, Tenimber (*Rev. D. van Roessel*).

Eustrotia brunneicolor, sp. n.

♂. Palpi with the 2nd joint broadly scaled and fringed with hair above towards extremity, the 3rd almost as long as the 2nd, fine; fore femora on fore side*, mid-femora at base; mid-tibiæ completely (except beyond middle) and hind tibiæ at the spurs fringed with rather long hair. Cell of hind wing shorter than half the wing, veins 8 and 4 from lower angle; stalk of 8, 9 in fore wing not anastomosing with 7, but only touching it.

Head, thorax, abdomen, and legs brownish grey.

Fore wing brownish grey, basal and postmedial areas dark brown; a brown subbasal line limited on both sides by pale, antemedial line brown, limited by pale, angled outwards below costa and cell, and inwards at the folds; a pale, slightly lunulate stripe on discocellulars; postmedial line brown enclosed in pale, angled outwards below costa, at vein 4, and at submedian fold; subterminal line double, the inner white, the outer brown, limiting the dark postmedial area, incurved below costa and vein 8, and somewhat below discal fold, excurved between veins 6 and 3; small diffused white spots before termen; brown terminal dots at the veins, those at veins 9 and 7 black and larger than the others; cilia brownish grey, with silvery-white spots at the veins. Hind wing fuscous, terminal area brownish, a waved brown medial line in anal half, bounded by whitish on both sides; termen whitish in tornal half, including a short brown line.

Below.—Fuscous grey, tinged with whitish, especially on hind wing; very faint, slightly waved, greyish medial and postmedial lines; whitish subterminal lines, and a grey dot on discocellulars of hind wing.

Expanse.—25 mm.

1 ♂, Okaba, Southern Dutch New Guinea (*Rev. P. Vertenten*).

Note.—In the type-specimen the palpi are almost straightly bent down, the fringes of hair thus being nearly on their fore side. I think, however, this position abnormal, and it

* The fore tibiæ and tarsi, unfortunately, are wanting.

seems wiser to await further specimens before separating this species generically.

Eustrotia ritsemæ, Sn.

Erastria ritsemæ, Snellen, Tijdschr. Ent. xxiii. 1879-80, p. 57.

1 ♂, Olilit, Tenimber (Rev. D. van Roessel).

Micrapatetis tripartita, Butl., ab. (?) *decipiens*, nov.

Hind wing not yellow, but dirty whitish, pale greyish in terminal half; without discocellular lunule.

Expanse.—12-13 mm.

Perhaps a good race.

1 ♂, 1 ♀, Olilit, Tenimber (Rev. D. van Roessel).

MESEMBREOSA, gen. nov.

Proboscis minute; palpi very slender, cylindrical, smooth, porrect, the 2nd joint reaching just beyond frons, the 3rd rather long; frons with a small rounded prominence; antennæ ♂ ciliated; thorax and abdomen without crests. Fore wing with the apex rectangular, the termen crenulate, straight to vein 4, then oblique to tornus; vein 5 from close to angle of cell, 6 from well below upper angle, 7 from angle, 8, 9, 10 stalked, 11 free from before end of cell. Hind wing with 3 from angle of cell, 5 feebly developed from well below middle of discocellulars, 6, 7 from upper angle, 8 anastomosing with the cell near base only.

Genotype, *M. albatra*, sp. n.

Mesembreosa albatra, sp. n.

♂. Antennæ and palpi, except black terminal joint, brownish grey; legs black, tarsi with pale rings; head dirty white with a brownish ring before antennæ; pectus, thorax, and abdomen grey, proximal half of the latter and anal segment tinged with yellowish.

Fore wing: above brownish black, terminal area beyond subterminal line and in lower half also beyond postmedial line yellowish white; costa with many yellowish points; the lines dirty whitish, more or less defined by black and with some greyish suffusion at some parts of their edges; subbasal line feebly sinuous to fold; antemedial line excurved below cell; some dark black scales at end of cell; reniform very broad pale greyish, with a black spot in centre and whitish outline, strongly constricted in middle, its outer edge formed by the postmedial which originates at

costa in a square yellowish spot above reniform, and is strongly outcurved at veins 6 and 4 and incurved at 5, then oblique to inner margin, somewhat incurved above vein 1, and with a pale greyish line just beyond it in lower half; subterminal line double, the outer whitish, the inner grey, very slightly incurved below costa and at the folds, outwardly dentate at veins 4 and 3; a series of black terminal dots at the veins; cilia yellowish white, black above middle and at tornus. Hind wing grey, the cilia paler, especially in tornal half.

Below.—Fore wing grey, some spots at costa, and terminal area in lower half pale yellow. Hind wing paler, a feeble postmedial grey line, excurved beyond cell, apical part of costal area darker fuscous; a row of pale subterminal spots, conjoined to a line in tornal half, and black terminal dots at the interspaces.

Expanse.—15 mm.

1 ♂, Olilit, Jamdena, Tenimber (*Rev. D. van Roessel*).

(?) *Rivula concolor*, sp. n.

♀. Pale ochreous white, the wings somewhat yellow; minute greyish dots on fore wing, in middle of cell, below origin of vein 2, at both angles of cell; a very faint subterminal series of such dots, rather strongly incurved below vein 3; minute dark terminal dots at the interspaces; cilia grey at tips. Hind wing somewhat paler, minute dark terminal dots. Underside without any markings (except a faint discocellular one on hind wing), paler than above except costa and termen of fore wing.

Expanse.—22 mm.

2 ♀, Olilit, Tenimber (*Rev. D. van Roessel*).

Seems to fit rather well in *Rivula*, although the development of vein 5 of hind wing is *Erastrine*, and veins 3 and 4 are not stalked but free.

EUTELINÆ.

EOPÆCTES, gen. nov.

Proboscis well developed; palpi upturned, 2nd joint reaching to middle of frons, rather broadly scaled, the 3rd moderate; frons smooth; antennæ of ♂ shortly ciliated; legs smoothly scaled; thorax clothed with scales, mixed with very few hairs, metathorax with a depressed crest; abdomen without crests; an indistinct lateral tuft of short hairs at base; a long tubular anal tuft.

Fore wing with the apex rounded, the termen crenulate,

oblique below vein 3; veins 3 and 5 from near angle of cell, 6 from upper angle, areole present, 8 and 9 very long on a short stalk, 10 from middle of areole, 11 from cell. Hind wing with the termen evenly curved, crenulate, veins 3 and 4 from angle of cell, 5 somewhat less strong than the others from below middle of discocellulars, 6, 7 from upper angle, 8 anastomosing with cell near base only.

Differs from *Phlegetonia*, Guen., by the tubular anal tuft, by the absence of a tuft of scales on frons, by the longer cell of hind wing, by vein 5 of hind wing being less strong and nearer middle of discocellulars; from *Anuga*, Guen., by the broader fore wing, the short antennæ, the form of termen, etc.; from *Pæctes*, Hübn., by the shorter and smoothly-scaled palpi, the simple thorax, the termen of fore wing, and the position of vein 5 in hind wing.

Genotype, *P. albomacula*, sp. n.

Eopæctes albomacula, sp. n.

♂. Palpi, head, thorax, abdomen grey; legs, pectus, and extremity and ventral surface of abdomen whitish.

Fore wing fuscous brown; an oblique black subbasal line, ending at submedian fold; a black marking in middle of cell, and one at end before reniform, which is entirely white, broad, somewhat constricted above middle, limited by black only externally; a blackish lunule and dot in submedian interspace before origin of vein 2; postmedial line black, double, outcurved between veins 6 and 2, the inner limiting the white reniform; a faint waved pale submarginal line; dark terminal lunules in interspaces; fringes fuscous brown. Hind wing fuscous; a round hyaline patch in end of cell and below it, covering origin of veins 2, 3, 4, almost reaching to upper angle of cell, not reaching inner margin; cilia whitish, except at apex and below middle.

Underside fuscous, whitish at base; fore wing with a white transverse marking at end of cell, and white terminal streaks in interspaces; hind wing with a transverse white median band reaching costa and inner margin, and with white streaks in interspaces.

Expanse.—24 mm.

1 ♂, Alusi (Jamdena), Tenimber, 1917 (Rev. D. van Roessel, M.S.C.).

Pateta carbo, Guen.

Phlegetonia carbo, Guenée, Noct. ii. p. 302 (1852).

1 ♂, Okaba, S. Dutch New Guinea (Rev. P. Vertenten, M.S.C.).

Patæta conspicienda, Wlk.*Patæta conspicienda*, Walker, List Lep. Ins. B.M. xv. p. 1748 (1858).

1 ♀, Merauke, Dutch New Guinea, in coll. Arnhem.

STICTOPTERINÆ.

(?) *Gyrtona elongata*, sp. n.

♂. Antennæ minutely ciliated. Fore femora and tibiæ broadly fringed with hair; mid and hind femora and tibiæ fringed with long hair.

Ochreous brown; head with some whitish before and beyond antennæ; palpi whitish on inner surface; a black spot at apex of 2nd joint and the 3rd (except the whitish tip) darker; ventral surface of abdomen, pectus, and legs whitish, fore legs greyish fuscous, the tarsi ringed with pale; abdomen above greyish fuscous.

Fore wing ochreous brown; a blackish, slightly waved, subbasal line from costa to below cell; antemedial line very slightly curved to below cell, then rather strongly inwardly oblique; a round annulus on discocellulars with pale and brown outlines, its centre large, brown, divided by a horizontal stripe of the ground-colour; postmedial line brown, filled in with pale, straight from costa to vein 8, then horizontal to vein 7, slightly oblique to vein 4, feebly incurved at discal fold, then strongly inwardly oblique, incurved at vein 2; some whitish points beyond it at costa; apical part of terminal area suffused with dark greyish brown, including an Σ -shaped mark of the ground-colour between veins 8 and 6, and a white point below vein 9, just before the subterminal line, which is whitish, excurved below costa, then parallel to termen, incurved at the folds; a curved fine white striga at apex; blackish terminal points, defined by whitish at inner side; cilia chequered grey and pale white at apex. Hind wing greyish fuscous, the basal area paler; cilia grey, dirty whitish at tips.

Below.—Fore wing brownish fuscous, costa ochreous, some white points towards apex, which is yellowish white with a similar dot before it; terminal white and dark spots. Hind wing similar, but pale whitish grey in anal part of basal area, a discocellular mark, and a minutely waved postmedial line greyish fuscous; rest as above.

Expanse.—25 mm.

1 ♂, Bakuag, Mindanao, Philippines, 24.9.1909 (Rev. A. van Odiijk).

This species shows distinct small paired anal tufts laterally

beneath the abdomen, thus resembling *Euteliinæ*. For the rest, however, it agrees so well with *Gyrtona*, not only structurally, but even in pattern, that I place it provisionally in this genus.

Stictoptera indescribens, A. E. Prout.

Stictoptera indescribens, A. E. Prout, Bull. Hill Mus. i. p. 206 (1922).

1 ♀ (ab. 10 Hmpsn. = ab. 4 ♂), Kei (*Rev. J. Klerks*).

SARROTHRIPINÆ.

Apothripa albonotata, Hmpsn.

Cletharra albonotata, Hampson, Moths Ind. ii. p. 384 (1897).

1 ♂, Cabuntog (Siargao I.), prov. Surigao, Philippines, 13.12.1909 (*Rev. A. van Odyk, M.S.C.*).

THRIPONEA, gen. nov.

♀. Proboscis fully developed; palpi obliquely upturned, smoothly scaled, 2nd joint reaching to middle of frons, 3rd long; frons smooth; thorax clothed almost entirely with scales, metathorax with depressed crest; abdomen with basal crest only.

Fore wing: costa highly arched at base, apex rounded, termen evenly curved and not crenulate, veins 3, 5 from near angle of cell, but 5 nearer than 3, 6 from upper angle, areole short, 11 from cell. Hind wing with veins 3, 4 stalked, 5 from angle of cell, 6, 7 from upper angle, 8 anastomosing with the cell near base only.

This genus is allied to *Sarrothripus*, Curt., and *Giaura*, Wlk., but differs from both by vein 8 of hind wing anastomosing with the cell near base only, from the former also by the smooth palpi and by veins 3 and 4 of hind wing being not so strongly stalked.

Genotype, *T. muricata*, sp. n.

Thriponea muricata, sp. n.

♀. Head, thorax, abdomen, palpi, legs white tinged with grey; antennæ fuscous, white at base.

Fore wing grey, a dark brown basal streak above cell conjoined to a streak at basal fourth of costa; another basal streak along median nervure, turning upwards and entering into cell, forming a costally open lunule; medial line indistinct, double, the inner whitish, the outer pale brownish, outcurved at the fold, incurved below costa and before inner

margin : reniform extremely indistinct ; postmedial line also indistinct, double, the inner pale brownish, the outer whitish, slightly waved, incurved at the folds ; subterminal line dark brownish, distinct, nearly straight, somewhat incurved at vein 5, limited by pale distally, a dark brownish costal spot at apex ; cilia grey. Hind wing brilliant white, termen greyish fuscous except at tornus ; cilia greyish, white at tornus.

Below.—Fore wing grey ; hind wing brilliant white, termen grey in apical half.

Expanse.—25 mm.

1 ♀, Higakit, Eastern Mindanao, 10.9.1909 (Rev. A. van Odyk, M.S.C.).

Selepa acervata, sp. n.

♀. Brownish grey ; tarsi very faintly ringed with pale ; abdomen more whitish, the crests very slight, concolorous with the abdomen.

Fore wing grey tinged with leaden, the medial area with rufous brown ; subbasal line not traceable ; an antemedial ridge of black scales with brown suffusion beyond it, slightly excurved in cell, strongly at submedian fold, then oblique and inwardly dentate above inner margin, the tuft of raised scales broadest below cell ; a tuft of white scales with raised outer edge beyond it in cell ; some raised black scales on discocellulars ; postmedial line double, the outer whitish, the inner brown, oblique—excurved from costa to vein 3, then retracted inwards to vein 2, then erect to inner margin, slightly dentate on vein 2, with tufts of raised scales above and below vein 1 ; a whitish patch towards apex beyond it at costa ; a very faint subterminal line, defined on inner side by some brownish suffusion, incurved at veins 5, 4, and 3 ; a maculate brown terminal line, with more or less conjoined whitish spots before it ; cilia long, greyish, with some paler and darker spots. Hind wing brilliant dirty white, the termen somewhat greyer ; cilia dirty white.

Below.—Fore wing grey. Hind wing similar to above.

Expanse.—16–18 mm.

2 ♀, Olilit, Jamdena, Tenimber (Rev. D. van Roessel).

Very much resembling *S. circulella*, Wlk., but much smaller, the antemedial line less oblique, the medial area differently coloured, etc.

Another ♀ from the same locality, in our collection, seems to agree with the two specimens described. However, I do not venture to say it is conspecific with them, as it is so much

damaged, and especially because vein 6 of the fore wing originates in the middle of the areole, instead of at the upper angle of the cell.

Labanda affinis, sp. n.

Head black with yellow lines behind and round eyes, and greenish scales on frons; palpi fuscous, yellowish on inner surface; tegulæ green with bluish-black bands before and behind; abdomen black above, grey below; pectus whitish; fore femora and fore tibiæ blue-black with pale rings, mid and hind tibiæ and tarsi with blue-black streaks.

Fore wing above greenish and black, medial area more closely irrorated with blackish; a greenish fine subbasal line, closely waved below costa, in and below cell; antemedial line fine greenish, heavily limited by black basally, strongly inwardly oblique, erect to cell, then inwardly oblique to median nervure, slightly excurved to vein 1, where it is somewhat incurved; a black costal bar at origin of medial line, which is absent, and of green postmedial line, which is broad at costa, erect to upper angle of cell, then strongly excurved to vein 3, incurved at submedian fold, outcurved again at vein 1, enclosed in black; its outer edge broadly so to vein 4, then finer, the broad black band continuing outwardly oblique to tornus, slightly incurved at vein 2; a black subterminal line, sharply inwardly dentate at discal fold, very close to termen, conjoined to postmedial black line above middle; termen finely black; cilia blue-black, grey at tips, with a fine pale line at base.

Hind wing fuscous; cilia as in fore wing.

Below.—Fuscous; hind wing paler; costa of fore wing tinged with yellowish; inner area silvery grey; cilia grey, paler at tips, with a pale line at base.

Ab. torniflora, nov.—Black outline of green postmedial line absent or very feebly indicated in lower part, the green scaling thus forming a conspicuous patch before tornus (2 ♀).

Expanse.—31–35 mm.

1 ♂, 2 ♀, Olilit, Tenimber (*Rev. D. van Roessel*); 1 ♀, Kei (*ab. torniflora*).

Near *achine*, Feld., but different by the shape and position of the lines.

CATOCALINÆ.

Agonista proutæ, sp. n.

♀. Grey-brown; hind tibiæ below and ventral surface of abdomen yellowish; thorax and abdomen brown with purplish tinge.

Fore wing darker than in *A. hypoleuca*, Guén., outer half closely striated with brown and tinged with yellow; basal part of costa somewhat tinged with purplish grey; a blackish-brown antemedial line, angled outwards below costa, and on the folds; reniform long, narrow, lunulate, scarcely paler than background, defined by black and yellow, extending to below cell; medial line distinct, blackish brown, oblique, slightly dentate on veins 2 and 1, postmedial line distinct, broad, rather diffused, oblique to below vein 7, then somewhat incurved and nearly straight, with some yellow before it; a series of faint marks before termen black and yellowish, lunulate between veins 4 and 1. Hind wing greyish brown to postmedial line, terminal area tinged with yellow; medial and postmedial lines distinct, the latter limited externally by yellow; a yellowish patch beyond it at costa; dark lunules before termen; inner margin yellow in tornal half.

Below.—Pale brownish grey; very faint traces of oblique medial and postmedial lines on both wings. Fore wing: postmedial line excurved below vein 7, defined on outer side by yellowish marks in the interspaces, the one below vein 7 large; yellow dots, faintly defined by black, before termen. Hind wing: a lunulate double yellowish mark on discocellulars; postmedial yellow marks between veins 8 and 4, outcurved below vein 7; anal area yellow, extending to the cell and vein 4; terminal area strongly striated with yellow between veins 6 and 4; a series of brown lunules before termen, defined by yellow on inner side, towards costa; cilia brown, on inner margin brownish yellow.

Expanse.—85 mm.

1 ♀, Dapá (Siargao I.), prov. Surigao, Philippines, 9.12.1909 (*Rev. A. van Odiijk*).

Entomogramma falcata, sp. n.

♀. Ochreous, more or less irrorated with fuscous.

Fore wing with a purplish-silvery gloss on costa and inner area to postmedial line; faint traces of a basal line at costa; medial line brownish, angled outwards at upper angle of cell, then almost straight, passing through lower angle of cell; postmedial line angled outwards below costa, then slightly oblique; subterminal line greyish, oblique from costa to vein 8, angled outwards at veins 8 and 7, parallel to termen till vein 5, then outwardly oblique to vein 3, where it is very near termen, angled inwards below vein 3 and on vein 2, ending at inner margin near tornus, thus forming a large,

inwardly oblique **W** between vein 3 and inner margin; a series of blackish points in interspaces before termen; a greyish streak from apex to inner margin near base, continued over thorax, straight to before medial line, then curved and more rufous; some grey irroration above it towards apex; veins slightly irrorated with grey scales. Hind wing: veins slightly irrorated with greyish; a dark dot at lower angle of cell; a fine straight oblique medial line; postmedial line broadly excurved, ending at inner margin near medial line; subterminal line indistinct, crenulate in interspaces; small dark points before termen; cilia brownish grey, white at tips.

Below.—Paler than above, more irrorated with grey scales. Fore wing with two black dots on discocellulars; medial line faint, postmedial line distinct, crenulate on veins; subterminal line indistinct, slightly crenulate; a series of points before termen. Hind wing with inner area whitish; two black discocellular dots; medial line indistinct, not reaching inner margin; postmedial line crenulate; a series of black points before termen.

Expanse.—35–40 mm.

1 ♀, Kei (*Rev. J. Klerks, M.S.C.*); 1 ♀, Olilit, Tenimber (*Rev. D. v. Roessel*).

Speiredonia biformis, sp. n.

♂. Fuscous black, frons tinged with scarlet, 2nd joint of palpi scarlet except at extremity and a line at side; legs brownish fuscous, femora fringed with scarlet hair; pectus and abdomen beneath, at sides, and at extremity scarlet, with black upperside and sublateral spots.

Fore wing above fuscous, the basal area darker; ante-medial line indistinct, excurved below costa; discoidal mark defined by black basally and outside, by silvery white above, its head filled in with black; medial line arising from its tail, crenulate, excurved around it, then oblique and faint; post-medial line distinct, crenulate, excurved around discoidal mark, then slightly oblique; faint traces of a crenulate double subterminal line; two strongly crenulate distinct lines before termen. Hind wing: traces of a medial line; subterminal line rather faint, diffused; a slightly crenulate line before termen.

Below.—Fuscous. Fore wing with a dark discocellular point; medial line excurved to vein 5, then oblique and somewhat incurved; postmedial line oblique to vein 5, then erect; subterminal line faint; faint spots in interspaces

before termen. Hind wing: medial and postmedial lines excurved at vein 6; subterminal line diffused, less distinct.

♀. Head, palpi, legs, abdomen as in ♂, dorsum less black; tegulæ brownish; thorax and patagia ochreous, the latter with a transverse blackish band before extremity.

Above.—Ochreous. Fore wing; antemedial line excurved below costa, forming a rather large brownish-fusca patch below cell to inner margin, with fuscous-brown suffusion beyond it between submedian fold and vein 1; medial line hardly crenulate, excurved around discoidal mark, then oblique; postmedial line crenulate, excurved below costa, then slightly oblique, its outer edge defined by some whitish below vein 4, broader and diffused at inner margin; a faint crenulate line before it below vein 3; an oblique rufous suffusion beyond head of discoidal mark to subterminal line between veins 5 and 6; a faint, somewhat triangular, greyish-purple patch at costa between medial and subterminal lines; the latter double, fuscous, less distinct than the other lines, especially towards costa; silvery-white streaks before it in interspaces 6, 7, 8, and rufous ones in cellules 4, 5; a double crenulate line before termen, the inner very sharply dentate in interspaces and in costal half produced proximally to short black streaks; a faint, square, fuscous, terminal patch in interspaces 3-5. Hind wing with diffused brownish antemedial and medial lines; a minutely crenate postmedial line defined on outer side by whitish; subterminal line double, the inner diffused and broad, including a straight ochreous line; dark crenate terminal lines; some brownish suffusion below middle of termen.

Below.—Scarlet mixed with some orange; markings black. Fore wing: a point in cell, two discocellular stripes; medial line not very distinct, excurved beyond cell; postmedial line crenate, oblique to below vein 6, then erect; subterminal line broad, somewhat oblique below costa, narrowing towards inner margin; a row of black internodal points before termen, lunulate between veins 5-2; a fine terminal line. Hind wing: a discocellular point; medial and postmedial lines outcurved at middle, the latter slightly crenulate; subterminal line broad at costa, slightly excurved outwardly, dentate on the veins; a series of spots before termen, lunulate between veins 5-2; a fine terminal line.

Expanse.—60-64 mm.

1 ♂, 2 ♀, Kei Is.; 1 ♀, Kei, in coll. Arnh.; some specimens also in coll. Joicey (The Hill Museum), and doubtless also in other collections.

Allied to *S. remota*, Feld., of which it may be only a race;

but different in ♂ by the distinct medial and postmedial lines, the absence of oblique subterminal line, presence of two crenulate lines before termen on fore wing, etc.; in ♀ by the subterminal lines being nearer termen, the inner one narrower, leaving a broader ochreous space between it and the postmedial line.

Speiredonia biformis tenimberensis, subsp. n.

♀. Differs from typical *biformis* in being darker, on account especially of some markings being larger. Fore wing above with the patch beyond antemedial line above inner margin larger; medial line more curved above inner margin, nearer antemedial line (5 mm. from it in *tenimberensis*, 7 mm. in somewhat smaller specimen of *biformis*); postmedial line less oblique below vein 3, at inner margin 6 mm. from medial line (4 mm. in *biformis*), nearer subterminal line. Hind wing: medial black band broader, space between postmedial and subterminal lines strongly suffused with blackish and greenish fuscous in inner half.

Below.—Fore wing: spots in middle of cell faint; medial line with two black patches on and beyond it between veins 3 and 5; postmedial line outwardly dentate in middle; hind wing with the postmedial line stronger, crenulate; inner edge of subterminal line waved.

1 ♀, Olilit, Jamdena, Tenimber (Rev. D. van Roessel).

Anua costiplaga, sp. n.

♀. Head ochreous-yellow; palpi brown, white in front; frons deep rufous; antennæ brown, ochreous-white on upper surface; thorax ochreous with green gloss; pectus, legs, and abdomen yellow, tibiæ and tarsi greyish black, lower side of tibiæ yellowish.

Above.—Fore wing yellowish brown, tinged with some rufous, basal and medial area with a greenish tinge; antemedial line fine, rather indistinct, brown, oblique; a very fine dark point in middle of cell; reniform small, almost round, scarcely constricted at middle, defined by a rufous line and with an indistinct rufous striga in centre; postmedial line faint, with some very indistinct suffusion before it, excurved beyond cell, then inwardly oblique, slightly incurved below vein 3, somewhat excurved above inner margin, ending at antemedial line; a triangular greyish-brown costal patch at postmedial line; subterminal line faint, rufous, excurved at vein 6 and above vein 3, incurved at veins 7, 5, 2, obsolescent at the veins; a black spot on it above veins 7 and 6, defined

on outer side by bluish white ; a similar spot just above inner margin near tornus ; a very faint crenulate rufous line before termen ; cilia greyish rufous. Hind wing yellower ; a broad black band before termen, reaching neither costa nor inner margin, narrow above vein 7, broadest at vein 5, very slightly narrowed towards tornus, indented at middle ; termen broader yellow than in *A. tongaensis*, Hmps. ; cilia yellow.

Below.—Yellow ; fore wing with a blackish subterminal patch between veins 5 and 2, and traces of a subterminal line between veins 8 and 5 ; cilia rufous. Hind wing with traces of a blackish subterminal line, which is distinct and broader towards tornus ; cilia yellow.

Expanse.—53 mm.

1 ♀, Kei, 17.5.1908 (*Rev. J. Klerks*).

Near *tongaensis* and *indiscriminata*, Hmps., but distinguished by the lines, the costal patch, etc.

Melipotis dubia, Butl.

Catephia dubia, Butler, Cist. Ent. i. p. 292 (1874).

Several very dark specimens from Jamdeua, Tenimber (*Rev. D. van Roessel*).

Ab. apicalis, nov.

♀. Fore wing black-brown, basal area with a purplish-grey tinge ; inner area and streaks in the interspaces of terminal half as in *ab. certa*, B.-Bak., some of them darker ; a black patch in submedian fold before middle ; an apical patch reaching vein 7, and cilia at it reddish brown.

1 ♀, Kei, in coll. Arnh.

Achæa lanipes, sp. n.

♂. Legs and antennæ as in *A. eusciasta*, Hmps., mid-tibiae with an ochreous tuft also beneath.

Tegulae, head, palpi, antennæ, pectus, legs greyish brown ; thorax red-brown ; abdomen greyish fuscous, base of ventral surface greyish brown, inner side and tips of claspers clothed with yellow hair.

Fore wing reddish brown, terminal area, except towards costa, a little darker ; subbasal line dark, excurved below costa, ending at the fold ; an antemedial blackish band excurved below costa and at vein 2, ending at vein 1, then continued by a very faint line ; a dark point in middle of cell ; reniform, black, not very conspicuous on account of a large, oblique, diffusely limited, blackish patch from costa above reniform to origin of postmedial line, its outer edge

diffusely and irregularly limited, reaching subterminal line between veins 6 and 2; a very faint waved medial line from vein 3 below the postmedial patch, postmedial line indistinctly double, oblique to vein 6, then dentate at the veins, somewhat incurved below vein 3; a pale waved subterminal line, indistinct between veins 6 and 3; black points before termen in the interspaces; cilia greyish brown, darker at apex and towards tornus. Hind wing dark fuscous; a bluish-white postmedial bar between veins 5 and 2; a white spot at middle of vein 1 δ ; a slight ochreous-white spot at apex, a terminal white spot at discal fold, and an oblique subterminal white bar in submedian interspace; cilia whitish at terminal spot.

Below.—Grey-brown irrorated with fuscous; terminal area paler. Fore wing with blackish discocellular bar, with some ochreous-white beyond it; a faint fuscous postmedial line ending at a large, diffused, brownish-fuscous patch at middle of terminal area, black points before termen. Hind wing: a faint fuscous discocellular line; medial, postmedial, and faint subterminal lines, the latter with dark suffusion before it; black points at termen.

1 σ , Kei, in coll. Arnh.

Differs from *eusciasta* chiefly by the postmedial patch of fore wing and the lines, especially subterminal one.

Parallelia serratilinea, B.-Bkr.

Ophiusa serratilinea, Bethune-Baker, Nov. Zool. xiii. p. 257 (1906).

1 φ , Okaba, Dutch New Guinea (*Rev. P. Vertenten*).

Parallelia illibata, F.

Noctua illibata, Fabricius, Syst. Ent. p. 592 (1775).

1 φ , Kei, in coll. Arnh.

Parallelia joviana, Stoll.

Noctua joviana, Stoll, in Cram.: Utitl. Kap. iv. p. 237, pl. 309 fB (1782).

1 σ , Olilit, Jamdena, Tenimber (*Rev. D. van Roessel*).

Parallelia prouti, sp. n.

σ . Orange red-brown; antennæ pale rufous-brown; tegulæ with a pale ochreous line at tips; patagia with a similar slightly curved line towards extremity; abdomen grey-brown, darker beneath except the ochreous base; pectus

greyish ochreous; legs brownish grey; abdomen with white sublateral points.

Above.—Fore wing purplish red-brown, basal and post-medial area deep reddish chocolate-brown, medial band rufous pinkish, suffused with dark grey at costa and in basal part; a fine, slightly inwardly oblique, subbasal brown line to submedian fold, defined on outer side by rufous pinkish; antemedial line brown, slightly incurved; medial band with its outer edge incurved, broadest at costa, remaining nearly of equal breadth below cell, slightly expanding below vein 1; postmedial line brown, defined on outer side by white, obliquely downcurved to below vein 6, where it is angled outwards, then incurved to vein 2, thence obliquely incurved to inner margin, ending at 1 mm. from medial line; some white points beyond it on costa, and a whitish shade on the veins from costa to above inner margin beyond it; the oblique apical shade rounded below and faintly defined by pale, its inner edge diffused; black points just beyond post-medial line at veins 3, 4, and a faint mark at vein 1; a fine brown terminal line with black points before it in the interspaces; cilia greyish, black at apex, with a pale line at base and at middle. Hind wing grey-brown; an oblique faint whitish shade from discal fold to before inner margin; a fine subterminal white line from vein 3 to tornus; a diffused purplish-grey shade from vein 3 to submedian fold; a very round brown terminal line; cilia with a whitish line at base and at middle, their outer half white from vein 7 to 5, and pale also below submedian fold.

Below.—Grey-brown, paler in basal part. Fore wing with a hardly traceable postmedial line, defined on outer side by ochreous at costa, excurved at vein 6, then incurved to above inner margin; some white points beyond it on costa; faint traces of a curved subterminal line in costal part; a fine brown waved terminal line with points before it; cilia whitish, brown-grey at tips. Hind wing: a faint discocellular dot; medial line strongly excurved beyond cell, incurved below it; postmedial line crenulate, outwardly dentate at discal fold; a white line below vein 2 towards tornus; terminal line as above, with blackish points before it; cilia brown-grey with a whitish line at base and middle; the outer half white and pale as above.

Expanse.—44 mm.

1 ♂, Kei (*Rev. J. Klerks*).

Belongs to subgenus *Dysgonia*, Hb., and seems to come nearest *vitiensis*, Butl., and *subacuta*, B.-Bak., but distinguished from both by the shape of the antemedial and post-medial lines, etc.

Parallelia cuneifascia, sp. n.

♀. Head and thorax red-brown; pectus whitish grey-brown; legs and abdomen grey-brown; spurs and tarsi ringed with whitish.

Fore wing purplish grey, basal area red-brown, somewhat suffused with greenish; a sublateral brown striga, defined by whitish, straight, ending at the fold; antemedial line not much darker than background, defined on outer side by pale, oblique, very slightly curved below vein 1; followed by a purplish-grey band, narrowing below costa towards inner margin, where it is only $\frac{1}{2}$ mm., thus being long wedge-shaped; medial line indistinct, slightly excurved below costa; outer part of medial area deep red-brown; postmedial line defined on outer side by whitish, oblique from costa to vein 6, where it is angled outwards, then oblique to inner margin at ± 2 mm. beyond medial line; some white points beyond it on costa; an oblique brown shade diffused on inner side from apex to vein 6 near postmedial line, defined on outer side and below by whitish; a very faint oblique subterminal line from vein 6 to inner margin with indistinct dark spots at veins 3 and 4; a slight brown terminal line with minute dark points before it in the interspaces; cilia greyish brown, with a whitish line at base. Hind wing grey-brown, faint traces of a whitish medial line below vein 3; a whitish subterminal line from vein 3 to tornus; termen tinged with grey between veins 5 and 2; a fine brown terminal line with dark points; cilia greyish brown, grey between veins 7 and 4, and towards tornus.

Underside greyish with brown suffusion, especially at costa and terminal areas. Fore wing: faint postmedial and subterminal lines, termen tinged with grey; a fine brown terminal line with dark points before it in the interspaces. Hind wing: inner area irrorated with some whitish; faint waved medial line; postmedial line waved, defined on outer side by whitish; termen tinged with greyish white; a fine brown terminal line with dark points before it.

Expanse.—40 mm.

1 ♀, Kei, 14.5.1908 (*Rev. J. Klerks*).

Easily distinguished from all allied species by the wedge-shaped medial belt of fore wing.

Parallelia missionarii, sp. n.

♀. 3rd joint of palpi moderate; fore wing more elongate and narrower than usual in *Parallelia*.

Reddish brown; pectus, abdomen, legs fuscous-grey; hind tarsi slightly ringed with pale; abdomen with sublateral white points towards extremity.

Fore wing uniformly red-brown, irrorated with some grey (especially at costa beyond postmedial line), and with bluish at base of inner margin; the lines paler reddish brown; sub-basal one from costa to below cell slightly curved outwards; antemedial line with a darker line on it, as in *P. illibata*, F., and *serratilinea*, B.-B., but the line much finer, oblique, slightly incurved; medial line represented only by a pale mark at costa and a narrow pale yellow-brown reniform with darker red-brown centre; postmedial line pale, with a somewhat darker brown outer edge, and greyish suffusion beyond it below costa; oblique below costa, then obliquely down-curved to vein 6, where it is angled outwards, then strongly incurved, and outcurved at vein 2, and somewhat incurved again above inner margin; subterminal line indicated by a faint rather broad greyish suffusion; apical black mark oblique to vein 6, its outer edge very slightly waved, the inner edge diffused; with some pale points above it at costa; a fine brown terminal line with points before it in the interspaces. Hind wing fuscous, with a strong greyish-purple gloss; some greyish suffusion before termen in tornal half; terminal line as in fore wing. Cilia of fore wing fuscous-grey, with a paler line in middle and a yellowish one at base; feebly chequered with whitish towards apex; of hind wing similar to those of fore wing, but whitish at tips, at tornus, and apex, and wholly so above middle.

Below.—Fore wing greyish; costa brownish, strongly grizzled with grey; terminal reddish brown, a feebly pale subterminal line from costa to vein 4, excurved below vein 7; termen whitish; terminal line similar to above, but the points blacker; cilia white with a very fine yellowish-grey line at base, and broader red-brown at tips. Hind wing fuscous-brown, strongly grizzled with grey, especially in basal half and towards inner margin; a very faint, pale subterminal line, waved, slightly excurved above middle; terminal line and cilia similar to above, but the latter paler, in lower half exactly as in fore wing beneath.

Expanse.—46 mm.

1 ♀, Olilit, Tenimber (Rev. D. van Roessel).

Parallelia fallax, sp. n.

♀. 3rd joint of palpi moderate.

Fuscous-grey; frons and antennæ more red-brown; tarsi tinged with

Fore wing: basal and postmedial areas deep purplish chocolate-brown; medial belt purplish white-grey, strongly tinged with purple dark grey towards costa; terminal area dark grey-purple; subbasal line hardly indicated by a few whitish scales just below costa, not entering into cell; antemedial line oblique to vein 2, feebly incurved in cell, somewhat outcurved at vein 2, then erect and nearly straight to inner margin; medial line straight and erect to vein 2, then slightly incurved and outwardly oblique; postmedial line slightly edged with pale; obliquely downcurved below costa, strongly dentate outwards at vein 6, then inwardly oblique to below vein 2, very slightly outcurved at middle, somewhat incurved above inner margin; some pale points beyond it at costa; subapical dark mark as in *dicæla*, Turn., with a pale outwardly open lunule on it below costa; subterminal line pale, strongly dentate, from vein 6 to inner margin just before tornus, the area before it darker brown-grey; terminal line fine, brown, expanding to points between the veins; cilia dark grey, whitish grey at tornus, with a pale line at base. Hind wing fuscous, with a pale bluish-white medial band; a short whitish subterminal bar before tornus; termen slightly tinged with purplish white in lower half; terminal line as in fore wing; cilia as in fore wing, but whitish below apex.

Below.—Almost as in the preceding species, but darker, less grey on hind wing; no trace of pale subterminal line on fore wing; a waved pale faint subterminal line on hind wing; termen greyish; terminal line and cilia similar to above, but the latter much paler grey, almost whitish.

Expanse.—42 mm.

1 ♀, Olilit, Teuimber (*Rev. D. v. Roessel*).

Very near *O. dicæla*, Turn., and probably conspecific with it.

Parallelia fallax septentrionis, subsp. n.

♀. Differs from *f. fallax* in the antemedial line being more oblique in its lower half, thus less excurved below cell; medial line not so erect, slightly incurved at vein 2, the medial belt thus more constricted at this point; postmedial line somewhat less incurved below vein 2. Underside of fore wing with a faint fuscous postmedial line excurved below costa; hind wing with a crenulate fuscous postmedial line excurved beyond cell (this line is hardly traceable in typical *fallax*). Medial white band of hind wing above much more prominent.

Expanse.—45 mm.

1 ♀, Kl. Kei (*Rev. J. Klerks*).

Chalciope hyppasia, Cr.*Noctua hyppasia*, Cramer, Uitl. Kap. iii. pl. cci. E (1779).2 ♀, Olilit, Tenimber (*Rev. D. van Roessel*).*Hypætra discolor*, F.*Noctua discolor*, Fabricius, Syst. Ent. iii. (2) p. 50 (1794).1 ♀, Kei (*Rev. J. Klerks*).*Mocis undata*, F.*Noctua undata*, Fabricius, Syst. Ent. p. 600 (1775).2 ♂, Olilit, Tenimber (*Rev. D. van Roessel*).*Pericyma cruegeri*, Butl.*Homoptera cruegeri*, Butler, Trans. Ent. Soc. Lond. 1886, p. 441.

Rev. P. Vertenten has reared several specimens from larvæ*. This species shows a very great variability and one should be inclined to consider some of its aberrations as quite distinct species. There is no doubt, however, that they are conspecific, the lines being exactly identical in shape and position, and especially because the larvæ show no differences. Nevertheless, it seems useful to describe the most remarkable aberrations, received from that collector at Merauke, Dutch New Guinea.

1 ♂, resembles rather well typical ♂ as described by Hampson in Cat. Lep. Phal. B.M. xiii.; another is more like typical ♀ described *l. c.*

♀, ab. *albilinea*, nov.—Subbasal line with a white line beyond it; subterminal line also white; rest of wing, with the exception of extreme base and termen, uniformly dark. (1 ♀.)

♂, ab. *alba*, nov.—Fore wing pure white from subbasal band to beyond postmedial line, only the reniform and costal postmedial patch dark; a very faint greyish suffusion in middle; hind wing with the lines more or less filled in with white. (1 ♂.)

♂, ab. *pallida*, nov.—Pale ochreous-grey; subbasal band and costal patch dark, but paler than in other forms; lines distinct, but paler; a black bar from medial to postmedial line in submedian interspace. (1 ♂.)

Anisoneura depressa, sp. n.♂. Near *A. zeuzeroides*, Guen.

Head and thorax blackish; tegulae ochreous-brown at tips;

* It is hoped to publish the description of pupa as soon as possible in *Natuurw. Tijdschr.* (Antwerp).

prothorax brown, separated from patagia by a black line; the latter brown with a blackish transverse line in middle, their distal half blackish mixed with brown and grey, chiefly at tips; palpi greyish brown, 2nd joint paler on inner surface; pectus clothed with rather long black and brown woolly hair; legs brownish grey; all femora and fore tibiæ with blackish woolly hair; spurs and tarsi with pale rings; tuft of hair of mid-tibiæ* yellowish white; abdomen grey, the dorsal ridges of hair brownish and blackish with some grey; ventral surface paler with ochreous-brown hair.

Fore wing dark greyish brown, tinged with grey and ochreous-brown and with a violaceous gloss, especially on outer half; a sinuous black subbasal line ending at cell; defined on outer side by ochreous-brown; antemedial line black, defined on inner side by ochreous-brown, especially in costal part, where the black is very indistinct, forming an indistinct blackish spot at costa, very inwardly oblique below costa, angled outwards at discal fold, median nervure, and vein 2, then strongly oblique to inner margin near base, angled outwards at vein 1 and strongly curved below it; a black point in middle of cell; reniform as in *hypocyanea*, incompletely defined by blackish, and with an interrupted brownish outline; a yellowish point at its lower extremity outside, and two oval patches of yellowish and black scales beyond it above and below vein 4; a black stripe with some whitish scales on it below cell; a very faint dark mark at middle of costa and an indistinct oblique sinuous medial line, which is double below cell; a dark costal mark beyond reniform, defined by brown; postmedial line arising below costa, oblique, waved, very distinct to vein 4, then indistinct and defined on outer side by brown; subterminal line brown, with oblique teeth to vein 2, inwardly defined by blackish which expands at inner margin; a black line before termen slightly dentate at the veins and somewhat oblique in the interspaces, with some brown beyond it.

Hind wing greyish brown, the lines interrupted by the grooves; a blackish antemedial line defined by brown and with traces of another dark line beyond it; a distinct waved black medial line outwardly defined by brown; a double slightly sinuous postmedial line filled in with brown, the inner distinct, the outer rather faint; a slightly sinuous black line before termen; the grooves greyish.

Underside.—Brownish grey with a violet gloss, especially

* Sir G. Hampson does not mention in *Anisoneura* ♂ the groove of mid-tibiæ with an exsertible tuft of hair. They exist, however, at least in *hypocyanea*, Guen., *zeuzeroides*, Guen., and *depressa*.

on the veins of hind wing. Very faint oblique medial, post-medial, and subterminal lines, which are excurved on hind wing and interrupted by the grooves.

Expanse.—117 mm.

1 ♂, Fân, Kl. Kei, 15.3.1921 (*Rev. P. van der Raad, M.S.C.*).

In comparison with *hypocyanea*, *depressa* has the fore wing broader, its termen not so oblique but more evenly rounded; it lacks the oblique darker shade towards apex; on the underside there is no trace of white and the lines are indistinct, straight, not crenulate nor dentate at all. By these characters it comes nearer *zeuzeroides*, from which, however, it is abundantly distinct by the broader fore wing, by the presence of patches of black and yellowish scales beyond and below the cell, etc.

I have to thank the Rev. J. de Joannis for comparing my description with a specimen of *zeuzeroides* in his coll. and the type of the latter in the Paris Museum.

PLUSIINÆ.

Plusia chalcytula, sp. n.

♀. Pale whitish grey, palpi darker; antennæ pale brownish and grey; metathorax and patagia dark bronzy; abdomen grey, the tufts bronzy; pectus and abdomen below whitish; legs grey, the tarsi with pale rings.

Fore wing dark bronzy, terminal area suffused with dark golden; subbasal and antemedial lines as in *P. chalcytes*, Esp., the latter double at costa, more oblique below cell, and slightly excurved above vein 1, a pale whitish annulus in cell; a silvery V-shaped mark below end of cell, not or hardly constricted in middle, nearly completely erect, not so obliquely turned basad as in *chalcytes*, filled in with pale; an ovate spot at its lower edge, conjoined to it; reniform dark, indistinct; postmedial line slightly incurved at discal fold, stronger below vein 2; this very much as in *chalcytes*; subterminal line pale, excurved below vein 7; incurved at vein 5, then obsolescent; a pale reniform mark with black centre and whitish outline above tornus at submedian fold; a distinct white transverse bar before termen between veins 5 and 8; some blackish and whitish marks before termen; cilia grey-fuscous with a pale line at middle, some darker spots, and a conspicuous black mark at vein 4. Hind wing uniformly fuscous; cilia grey.

Below.—Glossy fuscous, with some pale points at costa of

fore wing; hind wing with the base paler grey, with a trace of antemedial and medial lines.

Expanse.—25 mm.

1 ♂, Olilit, Tenimber (*Rev. D. van Roessel*).

Somewhat resembling *P. chalcytes*, but smaller, much darker in tone, the hind wing uniformly fuscous, and the fore wing with a distinct white anteterminal bar.

NOCTUIDÆ.

Catephia arctipennis, sp. n.

♂. Fore wing narrower than in *C. leucomelas*, L., and allies.

Head grey, palpi, vertex, and antennæ darker; thorax fuscous-grey; pectus and abdomen pale grey, legs darker grey with ochreous hair, the tarsi darker.

Fore wing grey-fuscous; antemedial line double, outwardly dentate below cell and vein 1; orbicular large, pale, with darker outlines; reniform pale, narrower, less oblique, less constricted than in *leucomelas* and *acronyctoides*, Guen., with dark and pale outlines; medial line indistinct, dentate; postmedial line much nearer the termen than reniform, at vein 6 ± 3 mm. from termen, and ± 5 mm. from reniform, oblique and inwardly dentate below costa, excurved to vein 5, then incurved, again outcurved at veins 4, 3, where it is feebly dentate, then incurved and inwardly dentate at submedian fold, and with a pale line at its outer edge; subterminal line faint, waved, pale. Hind wing brilliant white; terminal fuscous band much narrower than in *leucomelas* and *acronyctoides*, ± 4 mm. only, somewhat broader below costa, its inner edge finely dentate at the veins; termen white in apical half; cilia greyish, with a white line at base, completely white below apex.

Below.—Fore wing dirty white with a broad fuscous termen, much narrower than in *acronyctoides*, as broad as in hind wing; a fuscous discocellular bar; hind wing similar to above, but the black termen less dentate inwards; no discocellular bar.

Expanse.—36 mm.

1 ♂, Larat, Tenimber, 15.2.1909 (*Rev. J. Klerks*).

Erygia apicalis tamsi, subsp. n.

♀. Antemedial band before inner margin dark chocolate-brown, obsolescent, of nearly the ground-colour below vein 1; medial area slightly paler just before postmedial line, with

some waved lines, rest of the ground-colour; subapical mark dark chocolate-brown, nearly reaching vein 6. Hind wing pale fuscous-grey, darker at termen; subterminal pale bar before tornus yellowish white, conspicuous.

Expanse.—38 mm.

1 ♀, Kei Is., in coll. Arnh.

Near the Australian race (*squamiplena*, Wlk.), but not matching it, according to Mr. Tams, who has kindly examined this specimen for me.

Psimada quadripennis, Wlk.

Psimada quadripennis, Walker, List Lep. Ins. B.M. xv. p. 1828 (1858).

1 ♀, East Mindanao (prov. Surigao), Philippines (Rev. A. van Odiijk).

Othreis aurantia, Mre.

Ophideres aurantia, Moore, Proc. Zool. Soc. Lond. 1877, p. 607.

1 ♂, Olilit, Tenimber (Rev. D. van Ruessel).

Hamodes cochlearifer, sp. n.

♂. Palpi as in *H. hebraica*, Snell., and *gothica*, B.-Bak.; 1st joint blackish; 2nd yellowish grey with a brown-black bar in proximal half of upper-outer margin and a fuscous patch inside at extremity below; antennæ grey-fuscous; head, thorax, base of abdomen above, and fore wing ochreous, the terminal area of the latter paler; abdomen greyish fuscous; legs ochreous, femora with long woolly black hair, tibiae and first joint of hind tarsi fringed with ochreous hair, the former black at inner surface, spurs black ringed with pale. Fore wing: subbasal line formed by diffused grey scales; antemedial line broad, diffused, faint, outwardly oblique below costa, then erect; its inner edge ferruginous below cell, with a velvety-black mark on and beyond it as in *hebraica*, Sn.; a pale point with black outline in middle of cell and on discocellulars, the latter in a dentate black line; medial line broadish at costa; then fine, diffused, and broader again below cell; reniform very narrow with incomplete outline, the postmedial line beyond it limiting a paler patch which could also be considered as the reniform, broadish and diffused below costa, its inner edge dentate at the pale patch, then retracted below lower angle of cell; erect to vein 2, then incurved, joining the medial shade where it ends in a black point; a similar dark point also on submedian fold before the following entire line, which is slightly waved, erect, faint, diffused, preceded by a short

similar line below submedian fold, and followed by another similar line from costa to inner margin, less waved, with blackish point just beyond it at the folds and below vein 3; the area between the lines irrorated with greyish-fuscous scales; a subterminal ferruginous band, sharply limited basally, diffused on outer side, slightly incurved, with diffused blackish mark above discal fold and a diffused black line below vein 3 distally; black points before termen; cilia pale ochreous. Hind wing: base clothed with long hair; veins 8 and 7 with ochreous-grey androconial hair; basal half grey-ochreous, a fuscous narrow medial band, followed by a pale ochreous band, then a broad subterminal fuscous band, tapering towards inner margin, its outer edge diffused, termen pale ochreous, broader towards tornus, with black points before termen.

Underside.—Clothed with silvery-grey hair; a fringe of androconial hair along inner margin of fore wing from base of cell to tornus, turned costad; grey-brown; apical part of termen tinged with ochreous, with black points before termen between veins 8 and 5; hind wing with anal area paler grey; cilia of both wings slightly darker than above.

Expanse.—65 mm.

1 ♂, Kei Is., in coll. Arnh.

Saroba cinctipalpis, sp. n.

♂. Reddish brown, tinged with vinous; palpi with pale rings; antennæ grey-fuscous; abdomen grey-fuscous; legs wanting.

Fore wing tinged with grey-fuscous; white specks at costa, numerous in apical half; subbasal line pale below costa, two black points in and below cell; antemedial line represented by a black point at costa, a pale line inside it, outwardly dentate at cell, then strongly inwardly oblique and obsolete, a black point in cell and a basally open lunule in submedian interspace; orbicular black; reniform constricted in middle, its outline represented by two conspicuous black discocellular spots and a pale fuscous mark beyond them; medial line rather indistinct, diffused, strongly excurved beyond cell, then inwardly oblique, slightly incurved below reniform; postmedial strongly waved between the veins, strongly excurved below costa to vein 3, slightly incurved at discal fold; stronger at submedian fold, heavier at the interspaces than at the veins; subterminal line pale, slightly waved, incurved at the folds; black points before termen; a fine blackish waved terminal

line with pale points; cilia fuscous-grey, feebly chequered with pale reddish brown. Hind wing with a black discoidal bar; medial line slightly incurved beyond cell, postmedial line waved, fine, strongly incurved at the folds, the area before it paler than rest of wing, ochreous-white without fuscous or brownish irroration before inner margin; a pale slightly waved subterminal line; black points before termen; a fine blackish terminal line interrupted by pale points between the veins; cilia red-brown, slightly paler here and there.

Below.—Pinkish grey, irrorated with fuscous; black discocellular marks; slightly dentate and more or less interrupted fine postmedial lines; faint traces of subterminal lines; fuscous points before termen; terminal line and points much paler than above, cilia as above.

Expanse.—30 mm.

1 ♂, Olilit, Tenimber (*Rev. D. van Roessel*).

Blasticorhinus rivulosa, Wlk.

Thermesia rivulosa, Walker, List Lep. Ins. B.M. xxxiii. p. 1069 (1865).

1 ♂, 1 ♀, Olilit, Tenimber (*Rev. D. van Roessel*).

Hyperlopha cristifera orientalis, subsp. n.

♀. All lines very indistinct, thus nearly without any other markings than the grey suffusion, the very indistinct reniform, red-brown points below basal third of costa, below vein 7 before termen, and red-brown subterminal marks near tornus, which are larger than in *c. cristifera*, Wlk., not interrupted by a pale line; hind wing more suffused in terminal area. Underside of fore wing vinous red-brown; of hind wing pale grey, the subterminal line diffused and rather indistinct.

Expanse.—38 mm.

1 ♀, Kei (*Rev. J. Alerks*).

In describing this new form, which may be a distinct species, as the end-segment of palpi appears somewhat longer than in typical *cristifera*, I have made use of MS. notes supplied by Miss A. E. Prout.

Lacera alope, Cr.

Noctua alope, Cramer, Uitl. Kap. iii. pl. cclxxxvi. E, F (1779).

1 ♀, Olilit, Tenimber (*Rev. D. van Roessel*).

Hirsutipes excisa, sp. n.

♂. Fore wing not much broadened towards termen, the inner margin strongly lobed from base to middle, then excised, the tornus entirely rounded, vein 1 ending just

beyond the excision ; termen strongly bowed before tornus ; costa nearly straight, very slightly curved ; hind wing with the costa lobed before middle, the apex rounded but somewhat rectangular ; termen oblique, slightly excurved, tornus straight, inner margin with rather long grey androconial hair.

Head and tegulæ dull brown ; thorax and patagia paler red-brown, 3rd joint of palpi and antennæ ochreous-brown ; abdomen and pectus brownish grey ; clothing of legs blackish.

Fore wing greyish fuscous with a somewhat pale schistaceous-mauve tone, strongly irrorated with brownish ; a brown-black subbasal outwardly oblique band to vein 1, interrupted in cell ; antemedial line broadish at costa, interrupted by the veins, narrow in cell, obsolete below it, represented here and there by a darker suffusion ; a blackish point in middle of cell ; medial band faint, diffused, tapering towards costa, passing through end of cell, expanding somewhat beyond latter and including an oblique yellowish discocellular bar ; a faint diffused excurved postmedial line ending at vein 5 ; subterminal band diffused, rather broad, very inwardly oblique from apex to inner margin at the excision, some stronger suffusion beyond it between veins 5 and 3 ; slight diffused marks before termen. Hind wing pale fuscous-grey without any marking in costal half, *i. e.* to below cell and vein 4, the tornal area as in fore wing ; a dark velvety mark below vein 3, its inner edge diffused, its outer limited by a yellowish line, strongly incurved and almost divided by vein 2.

Below.—Fore wing pale fuscous-grey ; hind wing dark brown, without any markings.

Expanse.—43 mm.

1 ♂, Merauke, Dutch New Guinea ; in coll. Arnh.

Easily distinguished from the two other species of the genus—*crinipes*, Feld., and *intensior*, Rothsch.—by the shape of fore wing and the androconial hair of hind wing.

XII.—*New Moths from New Guinea, Kei, and Tenimber.*

By the Rev. G. HULSTAERT, M.S.C.

THE types of the species described in this paper are all in our collection at Heverlee, unless otherwise stated. Specimens mentioned with "in coll. Arnh." are in the collection of the Missionaries of the Sacred Heart, Arnhem (Holland), some specimens of which have been kindly sent to me by the Rev. A. Adriaanse, M.S.C.

Amatidæ.*Amata timura*, sp. n.

Near *A. trifenestrata*, Rüb., but differing by the absence of hyaline markings between veins 3 and 5.

♂. Antennæ slightly serrate, almost simple, ciliated, black, white at extremity; legs fuscous; head, thorax, and abdomen tinged with metallic greenish; head at sides beyond the eyes, tegulæ, metathorax, first segment of abdomen dorsally, slight dorsal rings on second and third segment, and sublateral spots on all basal segments fulvous orange; anal tuft dark.

Wings purplish, costa more greenish, veins more bluish; a conical hyaline spot at end of cell on fore wing; hind wing without any spot.

♀. Antennæ simple, the joints only very slightly expanding at tip, ciliated. Colour more metallic green than in ♂; orange of metathorax less developed; no orange rings on second and third abdominal segments; sublateral orange spots larger and present on all segments except anal one; anal tuft ochreous at extremity. Hyaline spot in cell larger; another hyaline spot below base of cell, and a very minute one at costa beyond cell above vein 6. Hind wing with hyaline spot below base of cell.

Expanse.—♂ 20 mm., ♀ 22 mm.

1 ♂, 1 ♀, Olilit (Jamdona), Tenimber, captured in copulation (Rev. D. van Roessel, M.S.C.).

Amata micantala, Hulst.

Amata micantala, Hulst. Ann. & Mag. Nat. Hist. (9) xi. p. 186 (1923).

In the original description of this species it is stated that the patagia are yellow; this is wrong, the patagia being concolorous with the thorax, but the tegulæ are yellow.

Arctiidæ.*LITHOSIINÆ.**Chionæma ochripicta*, sp. n.

♀. Face, palpi, antennæ, and a spot on vertex of head deep ochreous; legs white, fore tibiæ deep ochreous, with a white spot at middle; mid-tibiæ white, with a deep ochreous streak at base and at middle; all tarsi ochreous, with white spots; tegulæ deep ochreous, each with a white spot at middle; prothoracic and mesothoracic patagia at sides, mesothorax, and a paired spot on metathorax deep ochreous;

abdomen white slightly tinged with yellow, distal half crimson above, anal segment white.

Fore wing white, with the markings deep ochreous; subbasal line broad at costa, forming a dash in cell, turned distad below vein 1, not reaching inner margin; costa ochreous between this line and antemedian, the latter somewhat outcurved below costa, inwardly dentate at submedian fold; a dark brown discocellular dot; postmedian line with the inner edge indented at vein 6, the outer at median fold, the line thus narrower beyond cell, slightly excurved below middle; termen ochreous orange; cilia white.

Hind wing pink, termen orange, cilia white.

Underside pinkish; fore wing with some crimson beyond cell, termen and costa orange.

Expanse.—28 mm.

1 ♀, Olilit, Tenimber (Rev. D. van Roessel, M.S.C.).

Asura punctilinea, sp. n.

♀. Orange, tinged with crimson on some parts; antæ dark grey, with cilia and bristles; a patch on vertex of head, tegulæ (except behind), patagia, a patch on tibiæ, and claw-joint of tarsi brownish grey.

Fore wing above brownish grey; a subbasal pale yellow patch, another just beyond cell, and one above the latter at costa; a smaller indistinct pale antemedian spot at costa; a reddish medial point at inner margin; postmedial series of nine pale crimson points, strongly excurved at middle to vein 2, then straight to inner margin, the two costal points orange; terminal crimson spots at apex and above veins 5, 4, 2, the apical one rather large, the others indistinct; cilia pale brownish grey.

Hind wing tinged with pinkish, especially towards apex; cilia greyish, whitish towards toinus.

Below: fore wing pale crimson, yellowish at base; yellowish antemedial, medial, and postmedial spots at costa, rather faint, separated by greyish spots; a pale yellowish patch beyond cell; termen rather broadly brownish grey. Hind wing pale yellowish orange-crimson at costa; termen grey in apical half.

Expanse.—30 mm.

1 ♀, Olilit, Tenimber (Rev. D. van Roessel).

Asura roseifusa, sp. n.

♀. Pink, tegulæ tinged with pale yellow; antennæ grey; fore femora and all tibiæ towards extremity with a blackish spot.

Fore wing almost as in *simulans*, Butl. (as *quadrilineata*, Pag., in Cat. Lep. Phal. B.M. ii. p. 444, and pl. xxx. fig. 16), but inner margin and postmedial and terminal series of spots pinkish; basal part of costa fuscous; two antemedial spots in and below cell, suffused with pinkish; antemedial and medial costal patches of equal breadth at costa; postmedial patch beyond cell larger than basal one; cilia fuscous grey.

Hind wing pale orange, the costa and termen pink; cilia fuscous grey in apical half.

Below pink, the patches at base and beyond cell transparent; a grey subterminal line similar to above; hind wing tinged with yellow in anal half; grey dot below apex.

Expanse.—30 mm.

1 ♀, Langgoer, Kei (Rev. A. Peeters, M.S.C.).

Very probably only a form of *simulans*, Butl., the venation being the same as well as the general aspect of pattern.

I have compared it to *simulans*, not to *quadrilineata*, because these seem to be different species, or, at least, races, according to Mr. Tams.

Asura terminodenta, sp. n.

♀. Pale orange, abdomen and fore wing tinged with pinkish; antennæ, except at base, grey; fore and mid tibiae at middle and all tarsi at extremity with a grey ring; meso- and metathorax each with two grey spots; patagia with grey spot.

Fore wing with brownish-grey markings; a basal spot in cell; a subbasal line from costa to vein 1, excurved in and below cell; antemedial line oblique from costa, outcurved in cell, then oblique to inner margin; medial line straight from costa, shortly but strongly outcurved in cell, then oblique, not conjoined to postmedial line, excurved at submedian fold and incurved at vein 1, at costa nearer to subbasal line than to postmedial; the latter angled inwards below costa, then strongly and broadly outcurved to vein 3, outwardly dentate on veins, conjoined to subterminal line by a streak at middle, incurved at submedian fold; subterminal line formed by conjoined streaks, which are somewhat separated from each other, excurved at veins 6 and 4, touching termen at these veins; the costa beyond it and streaks in interspaces before termen orange-crimson; apical part of costa and cilia grey.

Hind wing ochreous white at base and middle, whitish orange with some pinkish at termen, especially towards apex; cilia grey in apical half, whitish ochreous towards tornus.

Underside of fore wing pinkish crimson; costa beyond

middle, some parts before termen, and cilia grey; veins pale. Hind wing similar to above.

Expanse.—30 mm.

1 ♀, Merauke, Dutch N. Guinea; in coll. Arnh.

Asura atrinervis, sp. n.

♀. Crimson, tinged with orange; a patch at tips of tibiæ and extremity of tarsi black.

Fore wing with rather broad fuscous lines; a basal point at costa; subbasal spots below costa and cell; antemedial line oblique from costa, outcurved in cell, inwardly dentate at submedian fold, outwardly on vein 1, then oblique to inner margin; medial line on costa nearer to postmedial than to antemedial line, excurved in cell, then strongly oblique to vein 1, straight to inner margin, conjoined to postmedial line by a streak at upper angle of cell; postmedial line oblique from costa, strongly outcurved beyond cell to vein 1, then straight, inwardly dentate at middle, its outer edge strongly dentate and produced into black streaks on the veins to termen, these streaks conjoined by fuscous suffusion, thus forming a band or patch; cilia fuscous.

Hind wing yellowish white, slightly tinged with pinkish at costa and termen; cilia yellowish white.

Below.—Fore wing crimson, yellowish white at base and inner margin, apical part of costa, streaks on the veins before termen and cilia fuscous grey; hind wing similar to above.

Ab. flava, nov.—Pale yellow on both sides (1 ♀).

Expanse.—29–30 mm.

Ohlit, Tenimber (*Rev. D. van Roessel*); several ♀, most of them rather much damaged.

Mitochrista rothschildi, nom. nov.

For *Mitochrista coccinea*, Rothschild. [*Nov. Zool.* **xx**, p. 215 (1913)], which is preoccupied by *M. (Barstina) coccinea*, Moore [*Journ. As. Soc. Bengal*, vol. lv. p. 98 (1886)].

ONYMAPATA, nom. nov.

For *Stenocyttara*, Hulst. [*Ann. & Mag. Nat. Hist.* (9) xi. p. 186 (1923)], which is preoccupied in Cossidæ by *Stenocyttara*, Turn. [*Trans. Ent. Soc. Lond.* 1918, p. 164].

Onymapata vittata, Hulst.

Stenocyttara vittata, Hulst. *Ann. & Mag. Nat. Hist.* (9) xi. p. 186 (1923).

There is a light brown spot on each half of the tegulæ, not of "patagia," as stated in the original description.

Engoa bipunctata, Wlk.*Lyclene bipunctata*, Walker, Journ. Linn. Soc., Zool. vi. p. 115 (1802).*Ab. basipuncta*, Hampson = *Padenia basipuncta*, Hampson, Ill. Het.

B.M. viii. p. 49, pl. cxxxix. fig. 8 (1891).

1 ♂, Olilit (Jamdena) (Rev. D. van Roessel).

DELOPLOTELA, gen. nov.

♂. Tongue well developed; antennæ minutely ciliated; palpi upturned, second joint reaching to about middle of frons, fringed with hair before at extremity, third rather short; fore tibiæ with a tuft of hair at inner side (contained in a groove?). Fore wing narrow, long, as in *Philenora parva*, Hampson; vein 2 from beyond middle of cell, curved; 3 from well before angle; 5 from above angle; 6 from below upper angle; 7 from angle, free; 8 absent; 9 and 10 on a moderate stalk from before angle; 11 free from well before end of cell. Hind wing: 3 and 4 stalked; 5 from well above angle; 6 and 7 stalked; 8 from middle of cell.

Genotype, *D. minuta*, sp. n.*Deloplotela minuta*, sp. n.

♂. Dirty whitish, abdomen below tinged with some yellowish; tarsi and tibiæ greyish, ringed with pale; antennæ pale brownish.

Fore wing dusted with many greyish scales; basal part of costa dark; dark subbasal, antemedial, medial, and post-medial lines, more or less expanding below costa, in and below cell; terminal area grey; containing a pale subterminal line, outwardly dentate on veins 7 and 4, and with some dark dots at both sides; a series of dark points before termen.

Hind wing dirty whitish, suffused with greyish, especially in outer half.

Below dirty whitish, tinged with grey in proximal half of fore wing.

Expanse.—12 mm.

3 ♂, Olilit, Tenimber (Rev. D. van Roessel).

NOLINOPHANES, gen. nov.

♂. Proboscis developed; palpi long, second joint porrect, reaching far beyond frons, fringed with hair below on whole surface, above at extremity only; third long, obliquely downcurved, smoothly scaled; antennæ ciliated, the basal joint with a tuft of scales as in most *Nolinæ* and some *Lithosiinæ*; frons above with a tuft of hair; tibiæ slightly fringed

with hair at outer side; fore femora with a tuft of long hair at inner side, fore tibiae fringed with long hair at inner side.

Fore wing narrow, as in *Eugoa* etc.; apex and tornus rounded; 2 from well before angle of cell, curved; 3 from before angle; 5 from above it, very near 4; 6 from just below upper angle, a very narrow but rather long areole; 7 from just beyond it, stalked with 8 and 9; 10 from before end of areole; 11 free from cell; vein 1 $\frac{1}{2}$ with a tuft of scales (androconia?) at both sides below middle of cell.

Hind wing: vein 2 from about middle of cell, 3 and 4 slightly stalked, 5 from above angle, 6 and 7 from upper angle, 8 anastomosing with cell to before middle.

Genotype, *N. sicciæcolor*, sp. n.

Nolinophanes sicciæcolor, sp. n.

♂. Antennae blackish; palpi grey, mixed with white, extremity and fringes of second joint entirely white; legs white, fore tibiae (except hair at inner side) and tarsi blackish ringed with white, mid-tarsi with the three terminal joints black; head and thorax grey and white mixed; abdomen greyish above, whitish beneath.

Fore wing dirty greyish white, with blackish-grey markings; a very fine thread-like subbasal line, closely followed by a well-developed antemedial line, broadly expanding at costa and at inner margin, where there are three spots of the ground-colour on it—one above, two below vein 1,—strongly outwardly oblique, straight, at inner margin expanding basad, crossed on median nervure by an inwardly oblique thread-like medial line from costa at middle to inner margin near base, indented below costa, outwardly dentate at median fold, then oblique to vein 1 before antemedial line, then straight to inner margin*; a somewhat triangular grey patch at costa beyond middle with white and black costal points on it; postmedial line originating on its extremity in the middle between cell and termen, very fine, oblique below costa, strongly dentate outwards at vein 6, incurved and dentate at median fold, outwardly minutely dentate above and below vein 4, incurved at submedian fold, then oblique to inner margin; subterminal line fine, obsolescent on the veins, outcurved below costa, incurved between veins 6 and 4, inwardly dentate in the interspaces, the teeth

* It would be possible also to describe the position of the antemedial and medial lines in another way: antemedial line outwardly oblique and broad to submedian fold, then inwardly oblique and thread-like; medial line inwardly oblique to fold, then outwardly, meeting the antemedial at the fold, broad in lower half.

strong, black, very prominent, the line thus appearing almost like a series of points; a series of faint, diffused, pale greyish internodal dots before termen; black interspaces at termen; cilia grey.

Hind wing dark grey.

Underside of both wings dark grey.

Expanse.—16 mm.

1 ♂, Olilit, Tenimber (*Rev. D. van Roessel*).

Note.—I place this species in the *Lithosiinae*, because I do not find any tufts of raised scales on the fore wing. The presence of an areole, too, is an indication for the position in this subfamily. The general aspect, however, as well as the palpi and the tuft of scales on the basal segment of the antennae, are more as in *Nolinae*. Hence further specimens will be necessary to give the exact systematic place of this new species, especially as the tufts of raised scales, if present, may have been rubbed off in the type-specimen.

ARCTIINÆ.

Mænas parvula, sp. n.

Veins 6 and 7 of hind wing not stalked, but connate (in *M. maculifascia maculifascia*, Wlk., ♂, these veins are stalked for at least one-third of their length in all specimens of the Coll. Brit. Mus., according to kind information by Mr. W. H. T. Tams).

Head and thorax similar to *M. m. maculifascia*; abdomen yellowish (?).

Fore wing almost as in *M. m. areoscopya*, Turn.; veins whitish; bands and spots pale brownish; basal half of costa, a subbasal spot on costa, a spot in basal half of cell similar to *M. m. maculifascia*; a spot below it; a double postmedial band, both complete and well separated from each other by a fine whitish line, the inner passing through end of cell and beyond it, the white colour in cell thus much reduced; terminal white area narrower than in *maculifascia*, nearly as in *areoscopya*, with some brownish dots.

Hind wing with a terminal brownish marking at tornus, a smaller one towards apex, and a costal one as in *maculifascia*, but smaller.

Expanse.—27 mm.

1 ♂, Okaba, Southern Dutch New Guinea, 1913 (*Rev. P. Vertenten, M.S.C.*).

Agaristids.

Agarista agricola latior, subsp. n.

♂. Fore wing: antemedial line and subbasal fascia as in

a. agricola, Don., the former straight towards inner margin; orange spot in cell smaller but well developed, that above base of vein 2 reduced but rather well marked, the lower one absent; postmedial series obsolete, whitish or with a very faint orange tinge on the costal ones; postmedial band of blue markings as in *a. agricola*, entire; three faint greenish subapical spots on veins 8 to 6; spot above tornus faint, but present.

Hind wing: blue band narrower than in *a. agricola*, the crimson one as in *a. biformis*, Butl.

Underside with the markings as well developed as in *a. agricola*.

♀. Fore wing: blue antemedial and postmedial lines well developed, the latter entire, as in ♂, the space between both below vein 2 to inner margin entirely filled in with blue and greenish, the basal part of wing from basal third of costa to inner margin beyond middle thus appearing broadly yellowish green and bluish, except a triangular black patch at inner margin before middle; an oblique medial fascia of the same colour as basal area from costa to vein 2, longly but narrowly expanding along costa distad; postmedial bluish or white spots above veins 6, 3, and 2, the lower ones almost as large as in *a. agricola*; submarginal greenish spots on veins 8 to 4; greenish tornal spot.

Hind wing as in *dæmonis*, Butl.

Underside of fore wing with bluish patch in and below cell, conjoined to a broad bluish band beyond cell; broad subterminal band excurved below vein 4. Hind wing with bluish basal markings below costa, vein 8, and in cell; postmedial band and anal red spot similar to above, but more distinct.

Merauke, South Dutch New Guinea; 1 ♂, 3 ♀ (*Rev. P. Vertenten, M.S.C.*); 1 ♂, 1 ♀, in coll. Arnh.

Liparidæ.

Arctornis (Porthesia) vanroesseli, sp. n.

♂. Deep yellow; antennæ, tibiæ, and tarsi wood-brown.

Above.—Fore wing with many brownish scales, forming a diffused medial band through end of cell, rather indistinct; a diffused faint postmedial line between veins 7 and 3 grey. Hind wing like fore wing, slightly angulate at vein 4; medial band of brown scales through end of cell not reaching costa.

Below.—Deeper yellow than above. Fore wing: a brown discocellular band to below vein 2; a sharply defined slightly

crenulate postmedial line from costa to vein 2, somewhat excurved. Hind wing: a diffused, somewhat sinuous, medial line through end of cell, excurved at middle; a fine postmedial line on fore wing, but more crenulate, more curved, much fainter; the space between the two lines somewhat deeper yellow than rest of wing.

Expanse.—32 mm.

1 ♂, Olilit, Tenimber (Rev. D. van Roessel).

Nygmia (Euproctis) pygmaeola, sp. n.

♂. Very pale yellow; abdomen whitish.

Fore wing very pale yellow, somewhat deeper in the interspaces; a whitish, somewhat obliquely curved line before end of cell; a similar line just beyond cell, 2 mm. separated from each other. Hind wing white, tinged with some yellow.

Below whitish, tinged with some yellow. Fore wing with the costa and termen yellow, and some crimson suffusion in and beyond cell.

Expanse.—17 mm.

2 ♂, Olilit, Tenimber (Rev. D. van Roessel).

This small species seems to be allied to *perpusillana*, Strand, from which it differs by the pale lines of the fore wing being more separated (in *perpusillana* hardly 1 mm., in *pygmaeola* ± 2 mm.) and also by the colour.

Anthelidae.

Anthela intermedia, sp. n.

♀. Pale greyish brown, irrorated with darker scales; pectus with ochreous hairs.

Above.—Fore wing: a greyish-black antemedial line, highly oblique from costa to a small blackish round spot with pale centre in middle of cell, then straight, inwardly oblique just above inner margin; a somewhat larger similar spot on discocellulars; postmedial line slightly oblique from below costa to inner margin; a subterminal series of points on the veins, very slightly curved at middle, more or less conjoined to a line below vein 3.

Hind wing: antemedial line strongly excurved on median nervure; a round discoidal annulus; postmedial line straight; subterminal series of points on the veins conjoined by a fine waved line, excurved below middle.

Below.—Tinged with dark ochreous, especially hind wing; on both wings a greyish spot in cell; discocellular spot similar to above; postmedial line diffused, on fore wing outwardly dentate below costa, on hind wing excurved below

middle; a subterminal series of points, slightly outcurved on fore wing, stronger on hind wing.

Expanse.—38 mm.

1 ♀, Merauke, Southern Dutch New Guinea; in coll. Arnh.

Anthela brunneilinea, sp. n.

♂. Head and scape of antennæ ochreous white, pectinations of antennæ pale wood-brown. Legs purplish grey, a white spot at extremity of femora, tibiæ fringed with hair at outer side; thorax, abdomen, and pectus orange ochreous yellow.

Wings above orange ochreous yellow, costa with some reddish, especially in basal third; a very faint trace of ante-medial line at costa; medial line rather distinct below costa, reddish, rest very faint, excurved in and below cell; whitish dots in middle of cell and on discocellulars, with a darker basal outline; postmedial line very distinct, purplish red-brown, oblique below costa and somewhat dentate on subcostal veins, oblique below vein 8 to inner margin just beyond middle, a faint series of dark points on the veins beyond it.

Hind wing without discocellular point, medial line very faint and fine, oblique from costa to median nervure beyond origin of vein 2, then straight to this vein and dentate to inner margin; postmedial line as on fore wing, straight to vein 7, then slightly excurved; a series of spots beyond it as on fore wing; a highly crenulate subterminal line, purplish and rather faint; cilia like wing, but darker in tornal half.

Below.—Similar to above, but fore wing strongly suffused with reddish in basal half; hind wing with dark points in cell and on discocellulars, not filled in with white; sub-terminal line almost quite obsolete.

Expanse.—56 mm.

1 ♂, Kei Is. (?). Although this locality is not quite certain, and even somewhat strange, nevertheless I should not be surprised if it should be confirmed by further specimens, as this is not the unique animal of the peculiar Australo-Neoguinean fauna found on the Kei group.

It is somewhat similar to *excellens*, Walk., from Queensland, but smaller, differently coloured and shaped, the termen of fore wing being very slightly curved and the apex hardly produced, whilst in *excellens* the termen is stronger bowed and the apex more pointed.

Anthela ekeikei, B.-Baker, ♀.

Anthela ekeikei, Bethune-Baker, ♂, Nov. Zool. xi. p. 403 (1904).

Head, thorax, abdomen, and wings reddish brown-grey; palpi and legs brownish; antennæ greyish, ochreous at base.

Fore wing: antemedial line sinuous, very faint below cell; medial line sinuous; a round white spot with darker outline in middle of cell, an oval one on discocellulars; postmedial line double, excurved below costa, then straight, the inner dark, sharply limited, the outer red-brown, diffused; the row of subterminal spots joined together by a yellow-brown sinuous line; some white at apex; terminal patch tinged with some yellow, its inner edge sinuous, continued in a sinuous line to inner margin near tornus.

Hind wing as in fore wing, but antemedial line absent and medial one blackish, only distinct in anal half.

Below.—Fore wing: antemedial and medial lines absent; postmedial line dark, simple, broadly excurved below costa, the apical white larger than above, extending to postmedial line; row of points extremely faint; termen entirely red-brown.

Hind wing: black points in cell and on discocellulars; postmedial line as on fore wing; row of subterminal dots and connecting sinuous line more prominent; terminal area reddish brown except towards tornus, its inner edge sinuous; the part of wing between postmedial line and terminal red-brown area more closely irrorated with whitish grey.

Expanse.—62 mm.

1 ♀, Okaba, Southern Dutch New Guinea (*Rev. P. Ver-tenten*).

Limacodidae.

Thosea axiothea, sp. n.

Near *penthima*, Turn., of which it may be the New Guinean representative.

♂. Antennæ bipectinate to near tip. Reddish brown, tinged with grey.

Fore wing with the medial area strongly greyish, base and termen more red-brown; a blackish discocellular dot; a dark brownish-grey subterminal straight line, oblique from before apex above point of separation of veins 8 and 9 to inner margin well before tornus; cilia darker.

Hind wing reddish brown, paler at base.

Below.—Red-brown, tinged with some ochreous and with many grey scales; cilia of fore wing a little greyer.

Expanse.—23 mm.

2 ♂, Merauke, Dutch New Guinea (one of them in coll. Arnh.).

Altha pulchrimacula, sp. n.

♀. Pale yellow; patagia ochreous.

Fore wing silky ochreous; black points below base of cell, above middle of cell somewhat basally, and a more conspicuous one at lower angle of cell; a silky chestnut submedian patch, extending to cell and vein 3, not reaching inner margin, its basal edge limited by white, and slightly excurved at middle, its lower edge rounded, with a large quadrangular excision below and distally; some greyish-white scales beyond it; traces of a curved postmedial line indicated by darker ochreous below vein 4; apical area whitish yellow, its inner edge straight from costa to vein 7, then outcurved to below vein 5, then horizontally oblique to termen at vein 4; some blackish at termen below this vein; cilia yellow ochreous.

Hind wing pale orange-yellow.

Below pale yellow.

Expanse.—30 mm.

1 ♀, Merauke, South Dutch New Guinea; in coll. Arnh.
2 ♀ from Singapore in B.M., *teste* G. Talbot, to whom I am indebted for kindly giving me his opinion about this and the preceding species, and comparing my specimens with the collections of Mr. Joicey and the British Museum.

XIII.—*Description of a new Typhlops from S. India and Notes on Brachyophidium and Platyplectrus.* By JOAN B. PROCTER, F.Z.S., F.L.S.

THE new *Typhlops* described in this paper formed part of a small collection of rare snakes from Southern India presented to the British Museum by Col. F. Wall, I.M.S. I would like to take this opportunity of thanking Col. Wall for his generosity in sending us a perpetual stream of similar valuable gifts, and I name the new snake *Typhlops walli* in his honour.

I. *Typhlops walli*, sp. n.

Habit slender. Snout somewhat truncated and projecting; nostrils latero-inferior. Rostral broad, $\frac{2}{3}$ the width of the

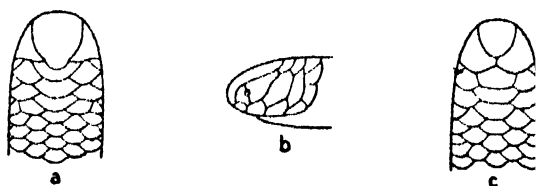
head, extending far back on the upper surface, roundly pointed behind. Nasal completely divided*, the cleft extending from the second labial. Præocular present, equal in size to the ocular, separated from the anterior nasal by the second labial, in contact with second and third labials. Eye indistinguishable†. No subocular. Præfrontal, frontal, and interparietal broad.

Scales in 20 rows throughout. Diameter of body about $\frac{1}{10}$ of total length. Tail $1\frac{1}{2}$ times long as broad, ending in a small blunt spine or conical scale.

Colour: light brown, each dorsal scale dark-edged; lighter beneath; head pale.

If the nasal be taken as divided, *T. walli* most nearly resembles *T. leucomelas* of Ceylon, but if incompletely divided, as is the case with Col. Wall's other specimens, it must be placed next to *T. thurstonii*. From the description in the

Fig. 1.



a and b, *Typhlops walli*, sp. n.; c, *Typhlops thurstonii*.

British Museum Catalogue of Snakes (vol. i. p. 26) Col. Wall supposed that *T. walli* was identical with the latter, but if specimens are compared, marked differences in the arrangement of the head-shields at once become apparent. In order to make this clear, I have figured the upper surface of the head of *T. thurstonii* as well as that of *T. walli* (vide fig. 1 a, c). In the former the posterior nasals are broadly in contact behind the rostral, which is relatively small, and in the latter the nasals are widely separated by a much larger rostral of entirely different shape.

Type-specimen: in the British Museum; registered number 1923.10.13.113. Adult. Wynad, S. India.

* Col. Wall states that he has collected two other specimens in which the cleft fails to meet the rostral, the nasal shield thus being only semidivided.

† Just distinguishable in Col. Wall's other specimens.

II. *Brachyophidium* and *Platyplectrurus*.

In 1921 Col. Wall founded a new genus, which he named *Brachyophidium*, for a Uropelt which differed from *Platyplectrurus* in having the eye in an ocular shield and no supraocular; and from *Plectrurus* with which it agreed in the former point in the presence of a temporal and absence of the supraocular. Until now the presence or absence of the supraocular has been utilized as a diagnostic generic character in this family, and I was quite satisfied that the new genus was valid. In 1922 Mr. G. A. Boulenger drew my attention to the fact that the type of *B. rhodogaster* appeared to be an aberrant *Platyplectrurus sanguineus*, a fact which had not occurred to me before, as Col. Wall had sent many specimens in which the supraocular was constantly absent. Recently, however, I have examined all the specimens of *P. sanguineus* in the British Museum with a view to clearing up this point,

Fig. 2.

a, *Brachyophidium rhodogaster*; b, *Platyplectrurus sanguineus*.

and find that in *Brachyophidium* the supraocular and postocular are simply fused into a single shield, which gives the appearance of an ocular extending above and behind the eye, and also to the apparent absence of the supraocular. The presence or absence of the dividing suture in this case makes all the difference between the eye being described as "situated in an ocular shield" or as "distinct from the surrounding shields" (*vide* fig. 2). In *P. sanguineus* there is also much individual variation in the sizes of the supra- and postoculars as well as in the form of the temporal, and it at once becomes obvious that the supraocular shield cannot be utilized as a generic character. In fact, were it not that *B. rhodogaster* differs from *P. sanguineus* in minor points—e.g., a slightly shorter frontal and larger præfrontals,—I should unhesitatingly unite them as one species. As it is, it seems better to maintain *B. rhodogaster* as a distinct species in the genus *Platyplectrurus*, Gthr., and to re-define the other Uropelt genera without reference either to the ocular, supraocular, or postocular shields.

I. No mental groove.

A. Terminal caudal scute enlarged and highly specialized as follows:—

- | | |
|---|------------------------------|
| 1. Large, circular or oval, rugose and flat, obliquely set | 1. <i>Uropeltis</i> . |
| 2. Large, rugose, and convex | 2. <i>Rhinophis</i> . |
| 3. Square or bicuspid, the points side by side | 3. <i>Silybura</i> . |
| 4. Compressed, ending in two superposed points which may be simple or compound. | |
| a. Temporal shield present | 4. <i>Pseudoplectrurus</i> . |
| b. Temporal shield absent | 5. <i>Plectrurus</i> . |

B. Terminal caudal scute not or but slightly enlarged, compressed, pointed

6. *Platyplectrurus*.

II. A mental groove

7. *Melanophidium*.

The presence or absence of the temporal shield appears to be but little more important than the presence or absence of the supraocular. As, however, *Pseudoplectrurus* and *Plectrurus* differ in both these points, I hesitate to suppress the latter genus without as careful a study of both genera as I have made in the case of *Platyplectrurus* and *Brachyophidium*.

XIV.—A new *Platythrips* from Siberia.

By OSCAR JOHN.

Platythrips badius, sp. n.

Female.—Head, thorax, and abdomen chestnut-brown; first antennal joint yellowish brown, second of the same colour, yellowish at apex, third yellow, slightly darkened, fourth yellowish brown, fifth and sixth dark brown, seventh also brown, in some cases somewhat lighter than the previous; femora and tibiae all chestnut-brown, the latter yellowish at tip, tarsi yellow.

Total length about 1.2 mm.

Head broader than long (5 : 4), widened somewhat in front between the eyes and before base. Eyes large, protruding, coarsely faceted; ocelli minute, the hind pair close to inner angle of eyes; behind the latter four minute spines placed in a row, and a bristle on each side of the head. Hind portion of the head strongly rugose, so that the sides seem from above covered with scales (as, for instance, in *Heliothrips*). Antennæ short and stout, 2.3 times longer than head, their first joint cylindrical, second pot-shaped, both of equal width and the broadest in the antenna; third broadly fusiform,

pedicillate, the most slender in the antenna; fourth more robust than third, broadly pedicillate; fifth broadly pedicillate, cylindrical or cup-shaped, not narrowed at apex, shorter than fourth; sixth of same length as third, both being longest in the antenna, gradually narrowed towards stylus; the latter a little less than half the length of sixth, elongate-conical; sense-cones on third and fourth segments single.

Measurements of antennæ (the individual differences in the several measured specimens are so slight that they are of no importance):—

Length of antennal joints in μ :

1.	2.	3.	4.	5.	6.	7.	
23.2	41.5	53	45	41.5	53	25	=0.28 mm.

Width in μ :

1.	2.	3.	4.	5.	6.	7.
33.3	33.3	23.3	25	25	26.5	10

Chin rounded, over-reaching mouth-cone, which is pointed, and attaining between the fore coxæ; maxillary palpi 2-jointed, first somewhat over half the length of second, the latter gradually narrowing towards tip; labial palpi 2-jointed, first joint very short.

Prothorax longer than head (5:4), slightly widened towards base, with a pair of stout but not very long bristles at hind angle*, a stout bristle at the middle of the sides, and three spines on each side at hind margin. Pterothorax but little longer than prothorax and of almost the same width, both distinctly rugose. Wing-rudiments short, but conspicuous, not over-reaching the pterothorax. Legs short, unarmed, with but few weak bristles.

Abdomen broad, about 2.34 times as long as broad (measured at 3rd segment), and broadly conical. The last two segments equal in length, each shorter than the 8th, the 10th with a slit on upper side. Dorsal plates with three longitudinal rows of setæ on each side; lateral bristles short, less than half the length of segment, only the bristles on the 9th segment somewhat longer than the segment itself; 8th with a pair of stout bristles at hind angle on either side; terminal bristles very short and weak. Ovipositor short and stout, being somewhat less than four times longer than wide (actual length 0.216 mm.) very slightly curved at tip.

* In most of my specimens these bristles are wanting, being broken off even in otherwise perfect specimens.

79 females of this species were captured at Kazatshie in the Jakutsk district on the lower Jana (at about lat. 71° N. and long. 135° E.) in Siberia by Chaplain L. Tshagin on the 3rd June, 1915 (coll. Mus. Zool. Petrop.).

Key to the Species of the Genus *Platythrips*.

- | | |
|--|-----------------------------|
| Ocelli absent, prothorax about same length as head, wings entirely wanting; head, thorax, and the two last abdominal segments lighter than the rest of the body, third antennal segment dark grey, legs brownish yellow | <i>P. tunicatus</i> , Uzel. |
| Ocelli minute, but distinctly visible, prothorax longer than head by one-fourth, wings rudimentary but conspicuous; body unicolor, dark, third antennal segment yellow, legs the same dark colour as the body, lighter only at the end of the tibiae and the tarsi | <i>P. badius</i> , sp. n. |

XV.—*A new Species and a new Variety of Ophiuroid, with Notes on a Collection of Ophiuroida from the Sudanese Red Sea.* By STANLEY T. BURFIELD, B.A. Cantab., M.Sc. Liverpool, Lecturer and Demonstrator in Zoology in the University of Liverpool.

My thanks are due to Prof. Sir W. A. Herdman for entrusting to me the collection of brittle-stars made by Dr. Crossland from the western coast of the Red Sea. I must also thank Prof. F. Jeffrey Bell, of the British Museum (Natural History), for help in identifying several specimens.

The collection comprises 368 specimens, containing 21 species belonging to 13 genera. Although the collection is, therefore, not a large one, it is quite fairly representative of the Ophiuroid fauna of the Red Sea, and contains about half the total number of species of this group which have been recorded from the Red Sea area.

Many of the specimens in this collection were obtained by breaking up corals, and this accounts for the large number of immature forms present.

The most numerous specimens occur in the widely distributed species *Ophiactis savignyi* (M. & T.) and in the genus *Ophiuthria*.

A word must be said with regard to the latter. A very large number of species have been referred to this genus, some of which have been very imperfectly described, and it is well known that this genus is in great need of revision. About 140 specimens in this collection conform fairly closely

to Koehler's species *Ophiothrix beata* (Koehler, 1907), the examples of which came from Suez and Djibouti. The specimens of this collection exhibit a good deal of variation in minor points and colouring, some appearing to be nearer *Ophiothrix nociva* (Koehler, 1907), described from a single specimen from the Congo, and some to *O. otiosa* (Koehler, 1898) from Malabar.

All these species are very closely related to *O. exigua*, Lyman, and in view of the already overloaded state of this genus I have considered it preferable not to attempt to add to the number of species.

One new species is described in this collection (*Amphiobia microplax*); and one new variety (*Ophiopsila pantherina*, Koehler, var. *occidentalis*).

The following are recorded from the Red Sea for the first time:—*Amphioplus laevis* (Lym.); *Amphioplus lobatus* (Ljung.); *Ophiopsila pantherina*, Koehler (var.); *Ophiomastix asperula*, Ltk.; *Ophiothrix nociva*, Koehler; and *Ophiothrix otiosa*, Koehler.

The case of *Amphioplus lobatus* is, perhaps, the most interesting. This species was described by Ljungmann (1866), the locality being "in mari juxta Sidney, Novæ Hollandiæ." It does not appear to have been discovered since this time, unless, as suggested by Koehler (1922), *A. lobatodes* of H. L. Clark (1915) is identical with this species; and it is certainly curious that this species, represented by a single specimen, should now appear in the Red Sea.

The littoral Ophiuroid fauna of the Indo-Pacific region is very rich both in genera and species. Koehler (1905), in his 'Siboga' report, concluded that about 270 species of littoral Ophiuroids were known in the Indo-Pacific region at that time. In connection with work on the present collection, this list was brought up to 1916, and it may be noted that 406 species had been recorded from the Indo-Pacific region. The present number is probably nearer 430.

Stations from which Specimens are recorded in this Collection.

- I. Suez. Lat. 28° N.
- II. Khor Abu Hamana. Lat. 21° 30' N.
- III. Khor Shinab. Lat. 21° 28' N.
- IV. Khor Dongola. Lat. 21° 11' N. to 20° 50' N.
- V. Mersa Ar-rakiya. Lat. 20° 15' N.
- VI. Suakin Harbour. Lat. 19° 6' N.
- VII. Shubuk. Lat. 18° 52' N. to 18° 43' N.
- VIII. Trunkitat Harbour entrance. Lat. 18° 48' N.
- IX. Tella Tella Kebira. Lat. 18° 51' N.
- X. Agig Bay. Lat. 18° 15' N.

These stations may be found on Crossland's maps in Journ. Linn. Soc. vol. xxxi. (1907-1915).

DESCRIPTION OF COLLECTION.

The latest classification proposed by Matsumoto (1915) has been adopted.

Order PHRYNOPHIURIDA, Matsumoto, 1915.

Family *Gorgonocephalidae* (Döderlein, 1911),
Matsumoto, 1915.

1. *Astroboa clavata* (Lym., 1862).

Station VII. 1 specimen.

A large specimen. Disc-diam. 55 mm.

Order LEMOPHIURIDA, Matsumoto, 1915.

Family *Ophiacanthidae*, Verrill, 1899.

2. ? *Ophiacantha dallasii*, Duncan.

Stations IV., IX. 3 specimens.

These are very young, and cannot be identified with certainty.

Order GNATHOPHIURIDA, Matsumoto, 1915.

Family *Amphiuridae*, Ljung., 1867 (emend. Matsumoto, 1915).

3. *Ophiactis savignyi* (Müller & Troschel, 1842).

Stations I., IV., VI., VII., IX. 145 specimens.

4. *Amphipholis squamata* (Chiaje, 1828).

Stations I., IV. 2 specimens.

5. *Amphiodia microplax*, sp. n. (Fig. 1.)

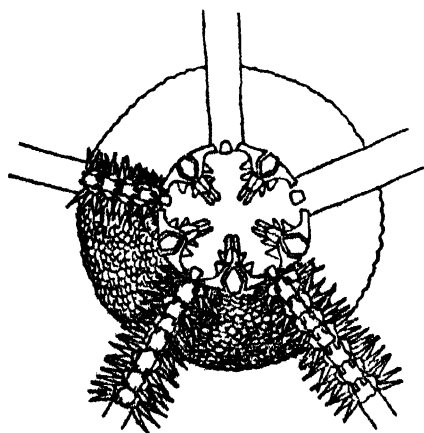
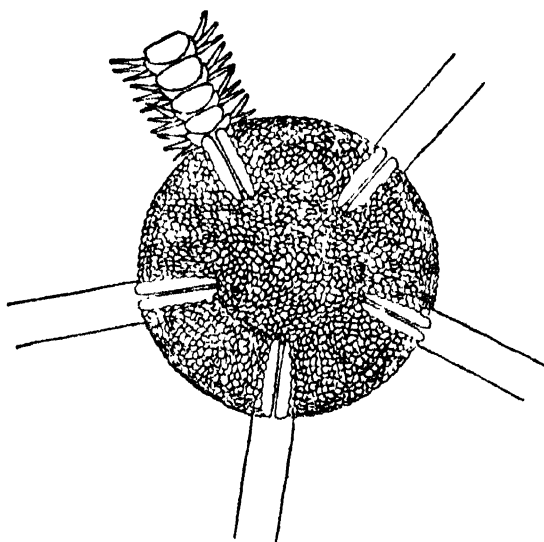
Stations IV. and VII. 2 specimens.

Disc-diameter = 3 mm.; arm-length = 39 mm.

D. : A. = 1 : 13.

These dimensions are for the Station IV. specimen. The other is slightly larger, having a disc-diameter of nearly 3½ mm. The arms in this specimen are broken off too short

Fig. 1.



2

Amphiodia microplax, sp. n.

1. Dorsal surface, $\times 14$. 2. Ventral surface, $\times 14$.

10*

for a reliable estimate of their length to be made. Disc rounded. Arms long and slender, becoming extremely narrow at the tip. Dorsal surface of the disc covered with small, uniform, imbricating scales. No rosette of primary plates can be distinguished. Radial shields narrow and joined along their whole length except for one small scale lying between their inner ends. These shields are about four times as long as broad, and their length is half the disc-radius. Along their outer borders a row of disc-scales a little larger than the rest can be distinguished. Ventral surface of the disc is covered with scales similar to those on the dorsal surface. Genital openings wide. The mouth-shields are longer than broad, spear-head shaped, with distal border very slightly convex. The proximal angle is distinctly curved, and does not form a sharp point.

The adoral plates are triangular, barely touching inwardly, and enlarged outwardly, where they extend down the side of the mouth-shield. There are three mouth-papillæ on either side. The two external are flattened and scale-like. The internal is a little longer than the others, has the form of a cylinder with rounded tip, and is turned inwards towards the centre of the mouth. The dorsal arm-plates are of a slightly flattened semicircular shape, with the distal border in the form of a flat curve. Their breadth is about one and a half times their greatest length. These plates just touch one another on the proximal part of the arm, but are separated by the side arm-plates distally. The first ventral arm-plate is small and four-sided, broader within than without. The remaining ventral arm-plates are squarish in outline, with distal border very gently excavated and proximal border convex. The lateral borders are slightly concave. The side arm-plates are projecting and meet below and above on the distal joints of the arm.

There are three subequal arm-spines, each about the length of an arm-joint. The spines are a little swollen at the base, with a flattened pointed tip. They are slightly roughened, the roughening appearing as a faint longitudinal striation. There is one large tentacle-scale. This has a straight inner edge and a slightly curved outer one.

Colour in Alcohol.—The specimen from Station IV. has the dorsal surface of the disc pale brownish green. There are brown spots on the distal corners of the upper arm-plates. The rest is white. The specimen from Station VII. has a pale brownish tinge.

Remarks.—These specimens belong to Verrill's subgenus *Amphiodia* of the genus *Amphiura*, characterized by having

three mouth-papillæ on each side, of which the external has the same form as the others. Within this subgenus the present species most nearly resembles *A. olivacea* (Brock) from the Eastern Indo-Pacific. It differs from this latter species mainly in the absence of large scales and small spines on the periphery of the disc, and in having ventral arm-plates of a different shape. Lyman, in the 'Challenger' Report, separates off two species of those which have three mouth-papillæ—*A. repens* and *A. pulchella*,—characterized by having one tentacle-scale and radial shields long and joined. *A. microplax* comes within this group, but is distinguished from *A. repens* mainly by having scales on the ventral surface of the disc, the latter species being naked below. The present species more nearly resembles *A. pulchella*, but is distinguished from this by the absence of a rosette of primary plates on the dorsal surface of the disc and by the shape of the tentacle-scale.

6. *Amphioplus hastata* (Ljungmann, 1866).

Stations I., IV., VI. 8 specimens.

7. *Amphioplus lævis* (Lyman, 1876).

Station II. 5 specimens.

Contrary to Lyman's description, the disc in these specimens is distinctly lobed.

This is the first record from the Red Sea.

8. *Amphioplus lobatus* (Ljungmann, 1866).

Station I. 1 specimen.

The peculiarity in the distribution of this species is mentioned above.

9. ? *Amphioplus personata*, Koehler.

Station IV. 2 specimens.

In both these specimens the disc-covering has been completely cast off, making exact identification impossible.

Family Ophiotrichidæ, Ljung., 1867.

The specimens placed under the three succeeding species gave a considerable amount of difficulty with regard to their exact identification. Koehler has described three very similar species—*O. beata*, from the Red Sea; *O. nociva*, from one specimen from the Congo; and *O. otiosa*, from two specimens

from the Malabar coast. There are all very closely related to *O. caigua*, Lyman. The differences between Koehler's three species rest chiefly on the exact shapes of the upper arm-plates and mouth and side mouth-plates, and on small differences in the relative lengths of the small disc-spines and arm-spines.

Koehler describes the colour of the dorsal surface of the species thus:—*O. beata*, "la couleur varie du gris ou du violacé au rose"; *O. nociva*, "gris bleuâtre"; *O. otiosa*, "uniformément rosée." A careful examination of about 140 specimens of this collection included in these three species shows that there are varying combinations of the above-mentioned characters. The specimens have been grouped under these three species rather than add to this somewhat confused family by making definite named variations.

A word must be said with regard to the presence of these species in the Red Sea. *O. beata* has been recorded only from this region (Suez and Djibouti). *O. otiosa* was brought from the Malabar coast, so that, in view of the close relations existing between the fauna of the western Indo-Pacific region and that of the Red Sea, it is not surprising that this species should be found in the latter region. The case of *O. nociva* is somewhat different; this species has been recorded from one specimen from the West African coast (Congo). The general distribution of the group shows that there are very few species indeed which "round the Cape" and are found both off Eastern and Western Africa. It would be interesting to obtain more specimens of this species from West Africa and the Cape region.

10. *Ophiothrix beata*, Koehler, 1907. (Fig. 2, 1)

Stations I., IV., V., VI., VII., VIII., X. 102 specimens.

The mouth and side mouth-plates do not quite correspond to Koehler's drawings. Comparing the drawing given here with Koehler's, it is seen that the exact shapes form a transition between those given by this author for *O. beata* and *O. nociva*.

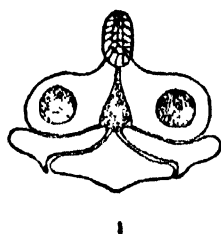
Of the 102 specimens, 68 are pink and the rest violet or bluish. There is no noticeable correlation between the colour and the station.

11. *Ophiothrix nociva*, Koehler, 1907.

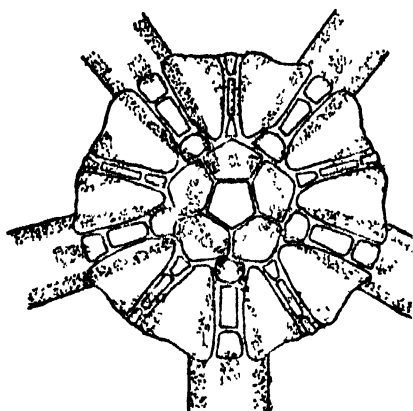
Stations I., IV., X. 22 specimens.

This species is recorded from the Red Sea for the first time.

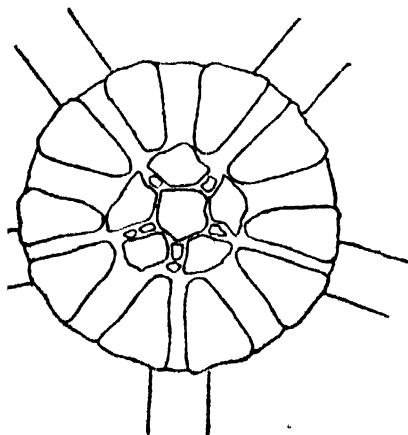
Fig. 2.



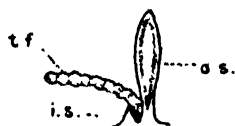
1



2



3



4

1. *Ophiothrix beata*, Koehl. Mouth-shields and side mouth-shields, $\times 12$.
2. *Ophiomaza cacaotica*, Lym. Dorsal surface, $\times 7$, showing form of central rosette and pigment distribution.
3. *Ophiomaza cacaotica*, Lym. Dorsal surface, $\times 7$, showing another form of central rosette.
4. *Ophiopsila pantherina*, Koehl., var. *occidentalis*. Tentacle-scales, $\times 30$.
o.s., outer scale; i.s., inner scale; t.f., tube-foot.

12. *Ophiothrix otiosa*, Koehler, 1898.

Stations I., III. 19 specimens.

This species is recorded from the Red Sea for the first time.

13. *Ophiothrix exigua*, Lyman, 1876.

Station I. 3 specimens.

14. *Ophiothrix demessa*, Lyman, 1869.

Station IV. 3 specimens.

15. *Ophiomaza cacaotica*, Lyman, 1871.

(Fig. 2, 2 and 3.)

Station VII. 14 specimens.

The rosette arrangement of plates in the middle of the dorsal surface of the disc shows a certain amount of variation. Lyman describes these plates as "very irregular pieces." This is not always the case, as shown by the arrangement in the specimen depicted in fig. 2, 2. The irregular arrangement is shown in fig. 2, 3.

Different distributions of the brown colouring of this species have been noted by various authors. Crossland describes the present specimens when alive as "brown or black, with a white stripe down each arm dorsally." In the alcohol-preserved material the distribution of the chocolate-brown pigment is fairly regular. This is shown by the shaded areas in fig. 2, 2.

Koehler has created a variety *picta* for a single specimen examined by him from "Les Iles de la Sonde." The distribution of colour here is different from that described above, but, as there appears to be a certain amount of variation in the distribution even in one collection of specimens, I have not thought it advisable to attempt to create another variety.

Order CHILOPHIURIDA, Matsumoto, 1915.

Family Ophiochitonidae, Matsumoto, 1915.

16. *Ophionereis dubia* (Müller & Troschel, 1842).

Station I. 16 specimens.

Family Ophiocomidae, Ljung., 1867.

17. *Ophiocoma scolopendrina* (Lam.).*Ophiocoma scolopendrina*, var. *erinaceus* (Müll. & Troschel, 1842).

Station IV. and one doubtful locality. 15 specimens.

The relation between *O. scolopendrina* and *O. erinaceus* is still a matter of discussion. Many authors, including H. L. Clark (1908) and Matsumoto (1917), consider the latter as merely a variety of the former species. Koehler's latest view (1922) is that they are separate species. I have followed the first-named authors.

Although most of the specimens in this collection can be distinguished fairly easily as belonging to one or other type, there are also some intermediate forms.

The two specimens from Station IV. are the *erinaceus* form.

Of the thirteen specimens whose exact locality is doubtful, six belong to the *erinaceus* variety, five conform to the description of *O. scolopendrina*, and two are intermediate. The intermediate condition is shown mainly in the amount of granulation on the ventral surface of the disc and in the coloration.

18. *Ophiocoma valenciæ*, Müll. & Troschel, 1842.

Station IV. 1 specimen.

19. *Ophiomastix asperula*, Lütke., 1869.

Station doubtful. 1 specimen.

This species is recorded from the Red Sea for the first time.

20. *Ophiopsila pantherina*, Koehler, 1898, var. *occidentalis*, nov. (Fig. 2, 4.)

Station IV. 1 specimen.

Disc-diameter=6 mm. Arm-length=48 mm.

D.: A.=1:8.

Although there is only one specimen of this species, it differs from Koehler's description in a number of minor points, which seem to be sufficient, when taken together, to warrant the establishment of a definite variety. The differences are as follows:—

- a. The proximal ends of the radial shields have a distinctly curved, though narrow, border, and cannot be described as pointed. Koehler describes them as "amincies et pointues," and so figures them.
- b. The upper arm-plates have their distal borders narrower and more sharply curved than in Koehler's figure.
- c. There are eight arm-spines on a few of the proximal

arm-joints and seven on the rest. Koehler describes only seven. The most ventral spine is the longest, as stated by Koehler, but he describes the remaining six as "subégaux," whereas in this specimen the two uppermost are distinctly longer than the other four or five.

- d. The external tentacle-scale is as described by Koehler, but the figure does not show the correct form. The scale is shown in fig. 2, 4. The internal tentacle is distinctly pointed, and not oval, as Koehler says.

Colour in Alcohol.—The colour also differs from Koehler's description. The general colour is pale brown, with whitish and darker brown spots scattered over the surface of the disc both dorsally and ventrally. The dorsal surface of the arms has darker brown patches every six joints or so. The ventral surface of the arms is pale brown and the arm-spines are of the same shade. The internal tentacle-scale is pale brown, with a darker brown border.

This is the first record of this species from the Red Sea.

Family *Ophiolepididæ*, Ljungmann, 1867.

21. *Ophiolepis cincta*, Müller & Troschel, 1842.

Station IV. 2 specimens.

LITERATURE REFERRED TO IN THE TEXT.

1866. LJUNGMANN, A. V. "Oph. viv. huc usque cognita enumerat." *Ofvers. K. Vet.-Akad. Förh. Arg.* 23, p. 303. Stockholm.
1898. KOEHLER, R. "Echinoid. recueillis par l'Investigateur dans l'Océan Indien. Les Oph. littorales." *Bull. Scient. de la France et de la Belgique*, t. xxxi. p. 55. Paris.
1905. KOEHLER, R. "Ophiures de l'Expéd. du 'Siboga.'" 2nd Partie. *Ophiures littorales*. Leiden.
1907. KOEHLER, R. "Rev. de la Collection des Ophiures du Mus. d'Hist. Nat. d. Paris." *Bull. Scient. de la France et de la Belgique*, t. xli. vol. i. Paris.
1908. CLARK, H. LYMAN. "Some Japanese and East Indian Echinoderms." *Bull. Mus. Comp. Zool.* vol. li. no. 11. Cambridge.
1915. CLARK, H. LYMAN. "Catalogue of Recent Ophiurans." *Mem. Mus. Comp. Zool.* xxv. no. 4. Cambridge.
1915. MATSUMOTO, H. "A new Classification of the Ophiuroidea." *Proc. Acad. Nat. Sci. Philadelphia*, 1915.
1917. MATSUMOTO, H. "Monograph of Japanese Ophiuroidea." *Journ. Coll. Sc. Tokyo*, vol. xxxviii. art. 2.
1922. KOEHLER, R. "Ophiurans of the Philippine Seas." *Bull. U.S. Nat. Museum*, 100, vol. v.

XVI.—*A Serpulid Polychæte from the London Docks*
(*Mercierella enigmatica*, Fauvel). By C. C. A. MONRO,
B.A.

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ON more than one occasion during the past two years a number of small Serpulids have been sent for identification to the British Museum from the London Docks, where they form masses of interlacing tubes growing upon the sides of vessels. The latest consignment to be received was collected from a barge in the Royal Albert Dock.

Examination showed that they possessed characters which placed them outside all the known British genera, and the following description was actually in type before I had access to Prof. Fauvel's paper in vol. xlvii. of the Bull. Soc. Zool. France of this year, in which he describes the same species found last year by Prof. Mercier in a canal near Caen. I publish this note as it was written, although it adds almost nothing to Fauvel's very thorough description, since the occurrence may be of interest to British zoologists.

As Fauvel points out, the species is allied to *Ficopomatus macrodon*, Southern (Mem. Indian Museum, v, Fauna of the Chilka Lake, No. 8, Polychæta, p. 655, 1921), a Serpulid known only from the brackish water of the Cochin Backwater near Ernakulam, Madras. They differ, however, in so many particulars that the creation of a new genus seems justified.

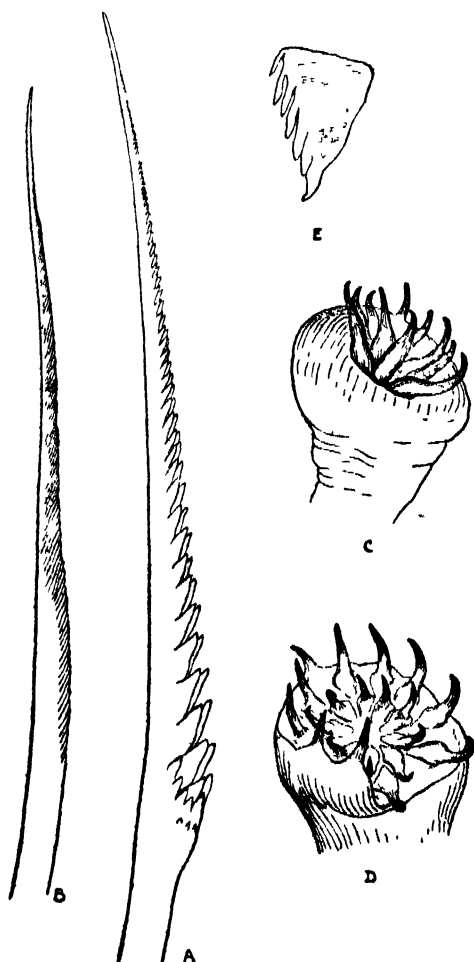
Mercierella enigmatica, Fauvel.

Bull. Soc. Zool. France, xlvii. no. 10, p. 424 (1923).

Description.—Length 10 mm., including the branchiæ. Breadth across first thoracic segment about 1 mm. Length of abdomen 4·5 mm. The colour of the branchiæ is light green, with seven transverse bands of dark brown pigment. The colour of the body is sage-green, which becomes lighter towards the posterior end. The sides of the thorax are of a dark brown broken up by the tori, which appear as a series of light yellow transverse streaks throughout the length of the thorax.

The collar, which is entire, without notches or lobes, is carried rather far forward and runs for some distance up the bases of the branchiæ. Dorsally it fuses with the thoracic membrane. This membrane is very wide, and its free edges often appear to fold over each other in the mid-dorsal line. It runs parallel with the median axis of the body throughout

the length of the thorax. At the posterior end it passes round the ventral surface as a wide lobe.



Mercierella enigmatica.

- A. Toothed chaeta from 1st thoracic segment, $\times 700$.
- B. Capillary chaeta from 3rd thoracic segment, $\times 800$.
- C. Operculum seen from the side, $\times 45$.
- D. Operculum seen from above, $\times 45$.
- E. Thoracic hook seen from the side, $\times 700$.

The branchiæ consist of six filaments on each side and the usual double row of pinnæ. The naked tips are sometimes

longer and sometimes shorter than the pinnæ. The inter-branchial membrane is low, and the branchial bases are not twisted into a spire.

There are seven chætigerous thoracic segments, the first chætigerous bundle arising from the collar. The tori of the 2nd segment are widely separated, and those of each of the succeeding thoracic segments are a little nearer one to the other, so that the inner edges of the tori form a triangle, the apex of which lies between the most posterior thoracic tori.

The collar chætæ are of two kinds. The stouter kind (fig. A), which are in the majority, have a straight smooth shaft and a backwardly curved distal portion armed with very stout teeth. These diminish in size towards the slender tip, at the apex of which they are very fine indeed. The proximal row of teeth is composed of 3 to 4 very small teeth set in a transverse line; this is not followed by a section of smooth shaft as in *Ficopomatus macrodon*, but by another row of larger teeth, the central one being slightly bigger than the others. These are followed immediately by the normal teeth of the blade, the first two rows of which are accompanied by a small tooth situated laterally. The teeth of the blade are double with a single tooth occasionally interspersed. They are accompanied by a few very delicate chætæ with finely tapered tips and a minutely pilose edge.

The chætæ of the remaining thoracic segments are all of one sort. Capillary with flattened blades, which sometimes appear smooth, and sometimes hispid along one of their edges. (Fig. B.)

The thoracic hooks have comparatively few teeth, the most anterior being hollowed out in the shape of a gouge (fig. E); the number of teeth is seven to eight.

The abdominal chætæ are geniculate, with an abruptly curved serrated tip and an expanded shaft below the curve. They are exactly like those figured by Southern for *Ficopomatus macrodon*. I am not sure whether they can be classed as "trumpet-shaped with one side produced into a long spine," the usual description for the abdominal chætæ which characterise *Pomatostegus* and *Spirobranchus*.

There appears to be no increase in number of the teeth of the uncini in the abdominal region. The abdomen itself, which is traversed by a ciliated groove in the mid-ventral line, terminates in a conical pygidium provided with two small appendages.

The operculum (figs. C and D) is formed from the dorsal-most filament of the left branchia. The peduncle, which is somewhat grooved dorsally, flattened and without any pro-

cesses, is of the same width for about two-thirds of its length, and then widens distally to receive the operculum. This is fig-shaped with its top hollowed out to form a shallow cup-shaped structure with a perfectly plain margin. Within and occasionally on this margin, which is without denticulations of any kind, there are a variable number of inwardly curved hooks arranged in a circular manner. The number and arrangement of the hooks show great variation. In a dozen specimens examined the number of hooks varied from 11 to 25. The number of most frequent occurrence was 14. The most common form of arrangement is two concentric circles of hooks, the hooks of the outer circle being larger and more numerous than those of the inner circle. There are frequently two or three hooks situated by themselves on the margin of the operculum, while the rest lie inside it. In a few cases there appear to be three concentric circles of hooks, the outermost circle containing the largest hooks being situated just within the margin. In one case there was a single circle of 18 hooks. The hooks themselves are black structures devoid of any secondary processes and curving inwards at their distal ends. The tube, which is similar to that of *Hydroides* and also to that of *Ficopomatus*, is thin-walled and clearly shows the line of growth.

The following definition of the genus is modified from that given by Fauvel:—

Family Serpulidæ.

Genus *MERCIERELLA*, Fauvel.

Generic Definition.—Chætæ of first thoracic somite of two kinds. A few very slender, backwardly curved, with a minutely hispid edge, the remainder having blades provided with stout double teeth, the proximal row of which is composed of three or more teeth set in a transverse line. Chætæ of remaining thoracic somites all alike, capillary.

Uncini with relatively few teeth, the lowest of which is hollowed out into the shape of a gouge. Abdominal chætæ geniculate with serrated blade.

Operculum fig-shaped, with a variable number of hooks.

Remarks.—The presence of the geniculate abdominal chætæ and the modified uncini bring this genus into relation with *Pomatoceros*, *Spirobranchus*, and *Pomatostegus*, but from these it differs in the form of the collar-chætæ and the shape of the operculum.

It is closer to *Ficopomatus* than to any other genus, but it differs in the following particulars:—

(1) In the modified collar-chætæ. There does not exist in

this genus the interval of smooth shaft between the teeth of the blade and the transverse row of teeth below the blade, which Southern describes in those of *Ficopomatus*. Moreover, the teeth are double and the arrangement of the proximal row is different.

(2) In the presence of only one kind of chæta in the remaining thoracic segments.

(3) In the possession of hooks on the operculum.

With regard to the distribution of the two genera, *Ficopomatus macrodon*, Southern, was obtained from two small pieces of wood in the Cochin Backwater, Madras; but this fact throws no more light on whence that species may have come than the occurrence of the species which I have described on the sides of ships which have lain for some time stationary in a London dock reveals its place of origin. Both genera seem to be able to withstand wide changes of salinity. Southern states that, although he had no precise information as to the changes of salinity in the Cochin Backwater, he believes it to be very variable. That the present species is capable of enduring great variations in salinity is demonstrated by the fact that my specimens were removed from a barge which had been plying up and down the lower reaches of the Thames for several months after the appearance of the Serpulid incrustation. This was first remarked after the barge had been lying stationary in the Albert Dock for about seven weeks. It appears to be spreading in brackish water on both sides of the English Channel, and it will be of considerable interest to watch its progress.

It may be of interest to note that Southern described from Lake Chilka a new Sabellid, *Fabricia (Manayunkia) spingicola*, which appears to show many affinities with the *Haplobranchus æstuarinus* described by Bourne from the mouth of the Thames.

XVII.—*New Species of Crane-flies collected by Mr. G. V. Hudson in New Zealand.*—Part II. By F. W. EDWARDS.

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ADDITIONAL material received from Mr. Hudson in June 1923 contained four further new species of crane-flies, which are described below. The types have been generously presented by him to the British Museum. At the same time Mr. Hudson sent, on behalf of the Canterbury Museum, a specimen of a remarkably interesting wingless *Gynoptistia*,

which is also described here ; the type of this species has been returned.

Amphineurus subdecorus, sp. n.

♀. *Head* blackish, clothed with long, light ochreous, scaly pubescence. *Antennæ* blackish brown, first segment rather short, less than twice as long as the second; flagellar segments subequal, elongate-oval, with rather short verticils. *Thorax* blackish, with long, rather scattered, scaly pubescence, light ochreous on the mesonotum, white on the pleura. *Abdomen* with pubescence of a similar character, but denser, dark brownish above, whitish beneath. No definite broad scales. *Ovipositor* rather long and slender. *Legs* densely clothed with similar scaly pubescence or hair-like scales. *Femora* ochreous on the basal half, shading to dark brown on the apical half, and with a rather narrow but conspicuous pre-apical ochreous ring. *Tibiæ* dark brown, narrowly pale at the base; front tibiæ with two whitish rings, mid and hind tibiæ each with a broader median whitish ring. *Tarsi* dark brown. *Wings* densely covered with close-lying pubescence similar to that of the rest of the body, mostly brownish in colour, but variegated with lighter and darker; darker brown in the region of the cord, but lighter before and beyond it, especially towards the costa. *Venation*: *R*₁ angled and spurred at base; cell *R*₂ with very short stalk; *r* placed near base of *R*₂; discal cell present; cells *M*₁ and 2nd *M*₂ equal at base; *Cu*₁*a* joining *M* immediately before the fork; *Ax* very long and slightly sinuous. *Halteres* clothed with ochreous pubescence.

Length of body 6.5 mm.; wing 6.5 mm.

North Island: Gollans Valley, near Wellington, xii. 1922, 1 ♀ (*G. V. Hudson*, no. 75).

This is most nearly allied to *A. perdecorus*, Edw., from which it differs most obviously in the coloration of the tibiæ and tarsi.

Molophilus pilosulus, sp. n.

♀. *Head*, including palpi and antennæ, black, black-haired. Flagellar segments shortly oval, pubescence as long as the diameter of the segments, verticils about twice as long. *Thorax* with the ground-colour rather bright ochreous; præscutum with five dark brown stripes, one median and narrow, a pair on the interspaces, and a broader marginal pair. *Scutellum* blackish; *postnotum* dark anteriorly. *Pleura* variegated with dark brown patches, leaving the *sternopleura* pale. *Præscutal interspaces* with golden hair. *Abdomen* dark brown, darker laterally, clothed with rather

short and moderately dense black pubescence. Ovipositor with the valves short and strongly curved, base much swollen. *Legs* with the integument light brown; pubescence short but dense and mostly black; front tibiae with a yellow line on the outer side, hind tibiae all yellowish; hind femora with much yellowish pubescence mixed with the black; tarsi all dark. *Wings* with the membrane light brownish, a slightly paler area in the middle just before the cord. Hair all dark. Besides the veins, the membrane is rather lightly clothed with hair over the greater part of the surface, excepting towards the base of cell *Ax* and in the pale central area. Venation: *R* less than half as long as *R*₂, which ends in cell *R*₂, this cell being slightly longer than cell *R*₃, with its base scarcely beyond the middle of the wing. Base of cell *M*₃ almost level with the base of cell *R*₃. *Cu*₁*a* joining the stem of cell *M*₃ at about one-third its length, the stem strongly angulated at this point. *Ax* ending below base of *M*₃. Halteres blackish, base of stem whitish.

Length of body 5 mm.; wing 5.5 mm.

South Island: Arthur's Pass, 3000 ft., 19.i.1923, 1 ♀ (G. V. Hudson, no 431).

Although it is possible that this species should be regarded as an *Amphineurus* on account of its hairy wings, yet the venation as described above is absolutely typical of *Molophilus*, and I have on that account assigned it to that genus. No species of *Amphineurus* known to me has *Cu*₁*a* placed well before the fork of *M*, as in the new species and as always in *Molophilus*; on the other hand, the occurrence of a hairy wing-membrane is not unknown within the genus *Molophilus*, as it is found in the European *M. murinus*, Mg. The present species bears a superficial resemblance to *Amphineurus niveinervis*, Edw.

Gynoplistia angustipennis, sp. n.

♂. *Head* rather dark dull grey. Antennae with the scape dark brown, flagellum black; formula of segments 2+4+7+4; longest branches about four times as long as the segments bearing them; branch of 13th segment very short. Palpi blackish. *Thorax* rather narrow, dull brownish grey, heavily pruinose, without markings; foveae large, reddish brown. *Abdomen* dark brown, posterior and lateral margins of tergites ochreous, the whole heavily pruinose with grey. Hypopygium long, with the ninth tergite square-ended; side-pieces without lobes or prominences; outer clasper not blackened, with a large tooth on the outer margin in the middle. *Legs* brownish, tarsi and tips of

femora and tibiae obscurely darker; femora with a slight trace of a pale preapical ring. *Wings* rather short and narrow, somewhat opaque, unmarked except for the stigma and a small dark spot over the base of *Rs*; tip also faintly darkened. *Rs* spurred at base; *r-m* very short but distinct; *M*₃ shifted to upper corner of discal cell, or actually (one wing) to beyond it, cell *M*₂ then being stalked; *Ca*₁ just beyond base of discal cell. Halteres brownish, tip of knob darker.

Length of body 12 mm.; wing 9 × 1.7 mm.

South Island: Arthur's Pass, 3000 ft., 22. i. 1923, 1 ♂ (*G. V. Hudson*, no. 430).

Apparently allied to *G. conjuncta*, Edw.

Gynoplistia resecta, sp. n.

♂. *Head* rather dark dull brownish, darker in the middle. Antennae with the scape brown, flagellum black; formula of segments 2 + 5 + 8 + 1; longest branches about five times as long as the segments bearing them; branch of segment 15 a little longer than the segment. Palpi short, black; basal segment about as long as broad, remaining portion only about three times as long, enlarged before the tip and not distinctly divided into segments. *Thorax* much reduced in size, brownish, pruinose, without definite markings, foveae very large. *Abdomen* dull dark brownish, with a black mid-dorsal line. Tergite 2 with the usual transverse shining patches united into a narrow band, which, however, does not reach the lateral margins. Tergites 1-5 each with an oblique row of minute shining pits on each side. Hypopygium rather small, ochreous; ninth tergite somewhat square ended; side-pieces simple; claspers not darkened, apparently simple. *Legs* (hind pair missing) of moderate length; brownish ochreous, tips of tarsi darkened. Coxæ rather large. *Wings* vestigial, only about half as long as the dark brown halteres.

Length of body 9 mm.; wing 0.9 mm.

Auckland Islands, March 1923, 1 ♂ (*G. Archey*).

This interesting species is probably allied to *G. pedestris*, Edw., of the Christchurch district, which is subapterous in both sexes. *G. resecta* differs from this in the much longer branches of the antennae and the still greater reduction of the wing-pads.

Macromastix occlusa, sp. n.

Generally similar to *M. aperta*, Edw., and *M. ferruginosa*, Edw., but showing the following diagnostic characters:—Basal segments of flagellum a little stouter than in the two

species mentioned; frontal tubercle perhaps rather more distinctly bifid. *Thorax* almost uniformly bright ferruginous-brown, the mesonotal stripes and an ill-defined spot on the upper part of the mesepisternum only faintly darker. *Coxæ* concolorous with the thorax. *Abdomen* mostly of the same colour, but with a rather broad median velvet-black stripe, which is scarcely widened on the posterior margins of the segments; narrow lateral black stripes, and a mid-ventral stripe commencing on the third sternite; eighth and ninth segments wholly greyish black. Stem of cell M_1 very short. Cross-vein r present, joining R_2 near the base.

North Island: Gollan's Valley, near Wellington, ii. 1923, 1 ♀ (G. V. Hudson, no. 166).

XVIII.—*A new Pika from the Altai.*

By OLDFIELD THOMAS.

IN a very interesting collection of small Altai Mammals obtained by Prof. P. Sushkin and recently received by the British Museum there are two examples of a *Pika* which appears to be new, and may be termed

Ochotona (Ogotoma) sushkini, sp. n.

Most nearly allied to *O. pricei*, Thos., but the colour much richer.

Size about as in *pricei*. General colour above a rich "cinnamon-buff" colour, dulled on the back by the dark tips to the hairs, clearer and brighter on the sides of the neck, flanks, and rump. Under surface similarly broadly washed with cinnamon-buffy, as compared with the whitish of *pricei*. Head greyer than back, and its buffy suffusion paler, yellower and paler than in *pricei*. Ears about as in *pricei*, though the pro-ectote is more definitely blackish. Nape with scarcely any trace of a light buffy collar, though there is an inconspicuous lighter patch behind each ear. Limbs paler than in *pricei*; upper surface of hands and feet glossy buffy; palms and soles more definitely brown than in the allied species.

The immature specimen has a dull greyish area on the fore-back, which is apparently the commencement of a greyish winter pelage.

Skull about as in *pricei*, except that it is less bowed above, and thus less strikingly a member of the subgenus *Ogotoma*, which depends on the frontal humping. Nasals anchylosed together. Palatal bridge a little narrower.

Dimensions, taken on a well-made skin :—

Head and body 200 mm.; hind foot (dry) 29; ear (dry) 18.

Skull: upper length 48.3 mm.; condylo-incisive length 44; zygomatic breadth 23; nasals 15.3 × 6; interorbital breadth 4.8; brain-case, breadth 20.2; breadth across bullæ 22.4; combined length of incisive and palatal foramina 13.8; palatal bridge 1.8; length of bullæ 11.7. Check-teeth (alveoli) 9.2.

Hab. Taldura Glacier, N.E. Altai.

Type. Adult female. B.M. no. 23. 12. 1. 80. Original number 17 (1912). Collected 22nd August, 1912, by Prof. P. Sushkin. Two specimens, adult and immature.

This Pika is evidently most clearly allied to *O. pricei* of N.W. Mongolia, but is distinguishable by its stronger cinnamon-buffy colour, both above and on the belly, its blacker pro-ectote, and its darker sole-pads.

In the skull the less convexity of the forehead is interesting, as it renders it to a certain degree intermediate between *Ogotoma* and *Pika*, and thus shows the correctness of these groups being treated only as subgenera.

I have named the species after Prof. Sushkin, to whose expeditions to the Altai in 1912, 1913, and 1914 we owe the very valuable series of mammals in which it occurs. Of Pikas he also obtained several examples of *O. pricei* on the Sara-Djmartay River, a tributary of the Kobdo, on the frontier of N.W. Mongolia; two of *O. dauurica altaina*, Thos., on Lake Uriug-noor at the mouth of the Kharige, N.W. Mongolia; examples that may be provisionally referred to *O. alpina*, Pall., on the Chernaria Berel river, S. of Bielukhu, and, finally, a series from the Chulyshman river, at the mouth of the Bashkaus.

Both of these last-named places are in the south-eastern Altai, and so near Tigerazkoi, the type-locality of Pallas's *O. alpina*, that specimens actually from the mountain near this place will be needed before a final decision can be come to as to the correctness of Hollister's application of the name *alpina* to the larger of the two Altai members of the group.

XIX.—On a new Fish-eating Rat from Bogotá.

By OLDFIELD THOMAS.

AMONG some small mammals presented to the British Museum by Brother Nicéforo Marín of the Instituto de la Salle, Bogotá, there occurs a specimen referable to *Ichthyomys*—a genus not hitherto obtained in the Bogotá region. The animal would seem to represent a new species, which may be

called after the keen naturalist to whom we owe its discovery :—

Ichthyomys nicefori, sp. n.

General colour of a similar grizzled blackish to that of the Ecuador *I. söderströmi*, though a little darker; very decidedly darker than in the brown *hydrobates* of Merida. Line of demarcation on sides less sharply defined. Inner aspect of ear white, with black edges. Hands black, with whitish digits. Tail uniformly blackish, not bicolor as in *I. stolzmanni*.

Skull larger and with more bulbous brain-case than in either *hydrobates* or *söderströmi*, smaller than in *tweedyi*. Height from basilar suture to crown 9·8 mm., as compared with 9·0 to 9·2 in *hydrobates* and *söderströmi*. Pterygoid fossæ comparatively broad, with well-developed ectopterygoids as in *hydrobates*; not as in *söderströmi*.

Dimensions of type :—

Hind foot (wet) 33 mm.; ear (wet) 10.

Skull: greatest length 33·5; condylo-incisive length 32·3; zygomatic breadth 16·5; nasals 12; interorbital breadth 5; breadth of brain-case 15; palatal foramina 6·8; upper molar series 4·3.

Hab. Neighbourhood of Bogotá. Type from Paimé, to the north of the capital.

Type. Adult male. B.M. no. 23. 11. 13. 9. Original number 11. Collected August 1923.

Apparently most nearly allied to *I. hydrobates*, but readily distinguishable by its larger brain-case and much darker colour.

XX.—*The Systematic Position of the Nematoda**. By H. A. BAYLIS, M.A., D.Sc., Department of Zoology, British Museum (Natural History).

In attempting to decide the affinities of a zoological group, there are commonly three important kinds of evidence upon which we may rely, and we may reasonably expect to find

* At the meeting of the British Association at Liverpool in September 1923, a discussion was opened by Professor S. J. Hickson, F.R.S., on the affinities and systematic position of the Nematoda. Professor Hickson took the view that the Nematodes were to be regarded as "degenerate Arthropods." The writer had the privilege of taking part in the discussion, and felt compelled to give support to Professor Hickson's general position, while wishing to modify it in certain particulars. The arguments here set forth are those used in the discussion, with slight modifications suggested at the time. The history of early theories as to the affinities of the group, which is felt to be of some interest, is mainly additional.

that they confirm or supplement each other. Firstly, there is the evidence of paleontology; secondly, that of development; and, thirdly, that which may be called the "morphological" evidence. The position of the Nematodes is one of the oldest and most difficult problems of zoology. Much of its difficulty is due to the absence of satisfactory evidence of the first two kinds.

The "geological record" tells us nothing of the origin, or even of the existence, of Nematodes. Cobb, a leading authority on the free-living Nematodes, considers that the present isolation of these worms and their apparent lack of close affinities with any other group point to their great antiquity. Other authors have also arrived at this conclusion from a study of the distribution of the parasitic forms, which tends to show that many existing genera must be of at least pre-Miocene age, and that there were probably Nematodes parasitic in the earliest ancestors of the vertebrates.

The ontogeny of recent Nematodes has clearly been so abridged and modified, and shows features so peculiar, that it affords no evidence of any value for our purpose. Unless, therefore, we are content to assume that this is an insoluble problem, that all "links" are completely "missing," and that the attempt to connect the Nematodes with any other group of animals is too speculative to possess any scientific value, we are compelled to rely solely on evidence of the third, or purely "morphological," kind. By this is meant the comparison of the morphological features of the Nematodes as a class, as we see them expressed in forms existing to-day, with those of other groups, and the attempt to find homologies between them.

Many zoologists, approaching the matter in this way, have tried to draw conclusions from one piece of evidence or another. An excellent summary of the views that have been held has recently been given by Seurat (1920). Some of the more important of these may be mentioned here.

Bastian (1866) suggested that some affinity existed between the Nematodes and the Echinoderms. This theory, however, appears to have been still-born, and no further support for it has been forthcoming. Some authorities, with whom superficial similarities of form probably assumed too much importance, have regarded the Nematodes as connected with the Annelids. Schneider (1866, 1873) supported this view by finding resemblances in the musculature and in the lateral and median lines of the two groups; while such forms as *Desmoscolex*, in which there is a superficial appear-

ance of segmentation, have been claimed by Greeff (1869) and others as links between the unsegmented Nematodes and the truly segmented Annelids.

Bütschli (1885), although he did not claim for the Trematodes any direct phylogenetic relationship with the Nematodes, saw a certain similarity between the nervous systems of these groups, and this has been more recently claimed by Martini (1913) as evidence of real relationship. Goldschmidt (1906) regards the condition of the "body-cavity" as proof of some connection between the Nematodes and the Platyhelminthes in general.

The Rotifer theory has received more support, perhaps, than any other. Bütschli (1876) regarded the Nematodes as derived from forms like the Gastrotricha, and connected through them with the Rotifers. From the latter, he thought, the Annelida and Arthropoda were also to be derived. Scurat points out, however, that Bütschli had in mind rather the Gordiids than the true Nematodes. Zacharias (1885), Hatschek (1888), Haeckel (1896), and others have placed the Nematodes in more or less close conjunction with the Rotifers, sometimes connecting with them also the Gastrotricha, Acanthocephala, and Chaetognatha. Quite recently Steiner (1920) has given a very ingenious and persuasive comparison of the Rotifers and the Nematodes.

The Chaetognatha have frequently been invoked as close allies or even as ancestors of the Nematodes. Haeckel (1866) and Schneider, in the same year, appear to have been the first to make this suggestion, which came into considerable prominence through Claus's text-book of zoology. Claus regarded the Chaetosomidae as forms transitional between the two groups. The Chaetognatha-theory has survived to the present time in Shipley and MacBride's 'Zoology.' Even if it could be substantiated, however, it is difficult to see that it would help greatly in forming an opinion of the ultimate position of the Nematodes, since the affinities of the Chaetognatha themselves are at least equally uncertain.

We come now to the Arthropod theory, which was restated by Professor Hickson, and received a considerable measure of support from others, in the discussion already referred to. Essentially, this theory is no new one. As we have seen, Bütschli, as long ago as 1876, coupled the Arthropods with the Nematodes as both derived from forms like the Gastrotricha. In a general way the resemblance of the Nematodes to Arthropods has been remarked by many authors, including especially Edmond Perrier and Maupas. Perrier

(1897) laid stress upon the presence of chitin and the absence of cilia in both groups. Arguing from the simplification that follows the adoption of a parasitic life in Arthropods, he considers the Nematodes as an extreme case of this (apparently forgetting the existence of free-living Nematodes). Maupas (1899) was impressed with the moults undergone by Nematode larvæ, and considered them an important point in favour of Arthropod affinities. Two authorities of considerable weight, Rauther and Seurat, have gone further, and pointed to the larvæ of Diptera as the Arthropods which approach most closely to the Nematodes. Rauther (1909) considers the Tardigrada to have been derived from the same common stock, and regards the Linguatulids as a link between Nematodes and Diptera.

It appears to me that the only way of arriving at any clear view is to attempt to define the essential characters of a primitive Nematode. In order to do this, we must have a good working notion of the variety of types that prevail at the present time, and this is where text-books of zoology are apt to be very misleading, because they convey the impression that the Nematodes are essentially a parasitic group, and lay stress on the characters of types that are by no means primitive, but rather (as in the case of *Ascaris*) almost the last word in adaptation to a parasitic existence—partly degenerate, but on the whole much more specialized.

The view has been widely held, and appears still to have some adherents, that the free-living forms originated from parasitic forms. Hubrecht (1904) considers that the free-living forms have been secondarily adapted to their mode of life, and that they are too small and uniform a group to be regarded as primitive. No doubt this view has arisen as a consequence of the apparent simplicity of organization of the Nematodes, which has suggested to many that they are "degenerate," and that this "degeneration" must have been the result of parasitic habits. The theory, however, apart from its *a priori* improbability, seems to rest upon an inadequate conception of the immense variety of the free-living forms, which are in reality by no means a small or uniform group.

A survey of the literature shows that over 400 genera or subgenera of free-living Nematodes have been described (including a certain number wholly or partly parasitic in invertebrates), while the number of known genera parasitic in vertebrates probably scarcely reaches 300. Now, considering how much better known are the comparatively large parasitic forms than the mainly microscopic free-living

forms, and how easy it appears to be to find new free-living forms any day in almost any sample of soil, or water, or plant-roots, from any part of the world, it is fairly safe to conclude that numerically the free-living Nematodes are far more important than the parasitic.

It seems to me (though, of course, it is a matter of opinion) most probable that the parasitic forms have been derived from free-living ancestors, and not the reverse. In any case, the structure of the free-living forms is, on the whole, much simpler and more generalized than that of the parasitic forms. External sense-organs, such as eyes and prominent bristles, have naturally been much reduced or lost in the parasites, which do not require them. In the free-living forms such external features are often highly developed, and there is a much greater variety, and often great complexity, in the mouth-parts as compared with the parasitic forms. This is, of course, correlated with the habits of the species, some of which are carnivorous and require formidable jaws for seizing prey, others feed on the juices of plants and require a piercing stylet, and so on. It seems clear that such characters as these must be secondary adaptations, probably with a long evolutionary history, but the internal anatomy of the animals remains simple and, it seems to me, can only be regarded as primitive. This was, in the main, the view of Leuckart (1879), who held that the parasitic forms showed a more marked divergence from the free-living in proportion as they became more strictly adapted to parasitism, and that some of them retained traces of their ancestry in the persistence of a free-living rhabditiform larva. It is supported by several of the most prominent specialists on the group at the present time (Cobb, Seurat, Steiner, Micoletzky).

Assuming, then, that the free-living forms are the most primitive, we are now in a position to attempt a definition of the hypothetical primitive Nematode. This attempt has been made already by Seurat (1920) and by Steiner (1920), but I am inclined to differ from both of them in certain small details, and should be disposed to draw up the definition somewhat as follows:—

Body covered with a simple cuticle, produced here and there, especially on head and tail, into sensory bristles, which were possibly jointed. Three lips, one being dorsal and two subventral. The mouth perhaps leading into a cavity with a thickened cuticular lining. A muscular oesophagus with a triangular lumen, lined with an invagination of the cuticle (the stomodæum). At the other end of the alimentary canal a proctodæum, connected with three unicellular glands. The subcuticular layer of the body-wall thickened in the lateral, dorsal, and ventral median

longitudinal lines. In the tail three unicellular glands connected with a "spinneret" or organ of fixation. A ventral unicellular "excretory gland" opening somewhere in the anterior half of the body. No flame-cells or cilia in any part of the body. A nervous system consisting of a circum-oesophageal ring with (probably) six longitudinal nerves running anteriorly and six posteriorly. No blood-vascular system. A continuous body-cavity which is rather a hæmocoel than a coelome, bounded externally by the muscles of the body-wall and internally by the outer tunic of the alimentary canal. Sexes separate. Gonads continuous with their ducts, the organs of the male consisting of two tubes running forward parallel to each other from the cloaca, into which they open behind. In the male two copulatory apicules of equal size and similar shape, accompanied probably by one or more pairs of smaller chitinous accessory pieces. The female organs consisting of a uterus with two opposed branches, connected with a short, undifferentiated vagina *. The primitive female Nematode would produce a very small number of large eggs, probably only one or two at a time in each branch of the uterus. The larvae, after hatching, would undergo four moults before reaching maturity.

Now, how does such a form as this fit in with any other known group? In the first place there is a point which may be of great importance, namely the combination of radial with bilateral symmetry. What is the significance of the frequent occurrence of the number 3 in Nematode anatomy—three lips, three-sided œsophagus even in two-lipped forms, three anal glands, three caudal glands, and so on? The only other groups of animals, as far as the writer is aware, in which a three-sided œsophagus occurs are the Pycnogonida and the Gastrotricha. This triradial arrangement seems a very great difficulty †.

Almost the only point where the primitive Nematode approaches the *Annelids* is the possession of a circum-oesophageal nerve-ring, but this, in some form, is shared by almost all metazoan invertebrates. Moreover, the ventral chain of ganglia is entirely absent in the Nematodes.

The *Gastrotricha* have an excretory system with flame-cells, and, further, they are hermaphrodite and their ventral surface is ciliated. The alimentary canal seems somewhat

* I cannot agree with Seurat and Steiner in imagining the female genital aperture near the posterior end of the body like that of the male, and two parallel uterine branches running anteriorly. In the great majority of free-living forms the vulva is in the middle of the body, and the two branches of the uterus run in opposite directions. In the comparatively rare instances where the vulva is near the posterior end, the posterior branch of the uterus, with its ovary, is often rudimentary or absent, and never equal and parallel to the other.

† Steiner (1921) thinks that this radial symmetry is not really a "primitive" character, but a secondary development resulting from a semi-sessile habit of ancestral Nematodes. But this surely implies its great antiquity, and in this sense primitiveness.

similar to that of a Nematode, especially in the triradiate œsophagus.

The *Rotifers* certainly bear considerable resemblances to Nematodes. Thus most of them have caudal glands, and in some (*Bdelloida*) there are paired gonads arranged like those of the supposed primitive male Nematode, though the gonad is usually single. The body-cavity has no epithelial lining, and is traversed by muscles. But the genital aperture is on the wrong side of the anus, and the aperture of the cloaca is dorsal instead of ventral. Moreover, the excretory pore is posterior, in the cloaca, immediately behind the genital aperture, a position only realized in imaginary Nematodes. There is no muscular œsophagus, but merely a ciliated tube. Whether the "mastax" may legitimately be compared with the œsophageal bulb possessed by some Nematodes is very doubtful.

The *Chaetognatha* have a muscular pharynx, and sensory papillae scattered about the body. The muscles are longitudinal, striated, and arranged in four quadrants, as in a Nematode. The *Chaetognatha* also resemble the Nematodes in the early differentiation of the genital cells. But the structure of the body-wall, which (in spite of some conflicting statements in text-books) apparently has a very thin cuticle, if any, overlying a definite epithelium, and that of the genital apparatus, which is monœcious, are all wrong.

The body-wall of the *Acanthocephala* is rather like that of the Nematodes, but there are circular as well as longitudinal muscles, and nothing else in their anatomy shows any real likeness. The presence of nephridia containing cilia is an important difference.

Coming finally to the *Arthropods*, and especially the Insects, we seem to find here the most hopeful series of resemblances. A typical Arthropod has a cuticular lining to its œsophagus, and gonads bearing great resemblances to those of the Nematodes. Insects have Malpighian tubes which may possibly represent the anal glands, and often male genitalia which may be compared with the spicules and accessory pieces of the male Nematode. Cobb (1917) has shown that the head-bristles of many free-living Nematodes are jointed, that the annulations of the cuticle are often reversed at the opposite ends of the body, and that the bristles on the body show signs of segmental arrangement. (They are not, however, arranged like true Arthropod appendages—a pair to each segment.) In some insect larvæ pædogensis occurs, so that there are actually some insects

somewhat resembling Nematodes in shape and capable of reproduction. Certain parts of Nematodes are composed of a substance resembling chitin, though the cuticle is soluble in potash and therefore is not of the same chemical composition as Arthropod chitin*. Finally, there are the absence of cilia, the absence of a coelome, and the moults undergone by Nematodes during development, all of which seem to indicate some relationship with the Arthropods.

Thus the morphological method, so far as it throws any light at all upon this extremely difficult question, seems to lead us to regard the Nematodes as in some way connected with the great Arthropod phylum rather than with any other group. But, as was pointed out by Professor Goodrich in the course of the British Association discussion, we must not lose sight of the well-known principle, in questions of this kind, of not attempting to derive one group from a highly-specialized branch of another, but rather looking for some simple and primitive common ancestor, of which perhaps no trace remains. Thus in the present case we must beware of laying too much stress upon the superficial resemblance of the Nematodes to such forms as the larvæ of Diptera, for we have no evidence that these are in any sense primitive Arthropods. On the contrary, they may well be more specialized than their parents, in adaptation to special modes of life.

Moreover, it seems probable that too much emphasis should not be laid upon "degeneration" as a factor in the evolution of the Nematodes. At all events, such degeneration would appear to have affected chiefly the parasitic forms in their probable evolution from free-living forms, and to have proceeded hand in hand with an even more marked specialization.

REFERENCES.

- BASTIAN, H. C. (1866.) "On the Anatomy and Physiology of the Nematoids, &c." Phil. Trans. clvi. pp. 545-638, pls. xxii.-xxviii.
 BÜTSCHLI, O. (1876.) "Untersuchungen über freilebenden Nematoden und die Gattung *Chaetonotus*." Zeitschr. f. wiss. Zool. xxvi. pp. 368-413.
 — (1885.) "Zur Herleitung des Nervensystems der Nematoden." Morph. Jahrb., Leipzig, x. 4, pp. 486-493, pl. xxiii.
 COBB, N. A. (1917.) "Segmentation in Nematodes." Science, New York, xlv. p. 593.
 GOLDSCHMIDT, R. (1906.) "Mittheilungen zur Histologie von *Ascaris*." Zool. Anz. xxix. pp. 719-737.

* According to Magath (Trans. Amer. Microsc. Soc. xxxviii. pp. 54-60, 1919) it is composed of an albuminoid which has been named *cornein*.

Notes on Two Species of Pseudophæa.

- GREFF, R. (1869.) "Untersuchungen über einige merkwürdige Formen des Arthropoden- und Wurm-Typus." Arch. f. Naturg. xxxv. pp. 71-121, pls. iv.-vii.
- HAECKEL, E. (1866.) *Generelle Morphologie der Organismen.* Berlin.
- . (1896.) *Systematische Phylogenie der wirbellosen Thiere (Invertebrata).* Berlin.
- HATSCHKE, B. (1888.) *Lehrbuch der Zoologie.* Jena.
- HUBBRECHT, A. A. W. (1904.) "On the Relationship of various Invertebrate Phyla." Proc. Acad. Sci. Amsterdam, vi. pp. 839-846.
- LEUCKART, R. (1879.) *Die Parasiten des Menschen.* 2nd edn., Bd. i. Abth. i.
- MARTINI, E. (1913.) "Über die Stellung der Nematoden im System." Verh. d. Deutsch. zool. Ges. xxiii. pp. 233-248.
- MAUPAS, E. (1899.) "La mue et l'enkystement chez les Nématodes." Arch. Zool. exp. et gén. (3) vii. pp. 563-628, pls. xvi.-xviii.
- PERRIER, E. (1897.) *Traité de Zoologie.* Paris, Fasc. iv.
- RAUTHER, M. (1909.) "Morphologie und Verwandtschaftsbeziehungen der Nematoden, &c." Spongel's Ergebn. u. Fortschr. d. Zool., Jena, i. 3, pp. 491-606.
- SCHNEIDER, A. (1866.) *Monographie der Nematoden.* Berlin.
- . (1873.) "Untersuchungen über Plathelminthen." Ber. d. Oberhess. Ges. f. Nat- u. Heilk., Giessen, xiv. pp. 69-140, pls. iii.-vii.
- SEURAT, L.-G. (1920.) "Histoire naturelle des Nématodes de la Berbérie." Première Partie. (Travaux du Laboratoire de Zoologie générale, Université d'Alger.).
- STEINER, G. (1920.) "Betrachtungen zur Frage des Verwandtschaftsverhältnisses der Rotatorien und Nematoden." Festschr. für Zschokke, no. 31, Basel.
- . (1921.) "Untersuchungen über den allgemeinen Bauplan des Nematodenkörpers." Zool. Jahrb., Anat. xliii. pp. 1-96, pls. i.-iii.
- ZACHARIAS, O. (1885.) "Über die Bedeutung des Palmform-Stadiums in der Entwicklung von Rotatorien und Nematoden." Biol. Centralbl., Erlangen, v. pp. 228-233.

XXI.—*Notes on Two Species of Pseudophæa (Odonata).*

By HERBERT CAMPION.

IN 1900 W. F. Kirby published a paper, "On a small Collection of Odonata (Dragonflies) from Hainan, collected by the late John Whitehead" (Ann. & Mag. Nat. Hist. (7) v. pp. 530-539). Among the material dealt with was a single male specimen of a species of *Pseudophæa*, which the author referred provisionally to *P. decorata*, Hagen, a species with which he was imperfectly acquainted. An enlarged figure of the entire insect was given on pl. xii. fig. 2. In 1912 Dr. F. Ris pointed out that Kirby's insect from Hainan is not the true *decorata*, although it belongs to the same group of species (Suppl. Ent. Berlin, no. 1, p. 53). It is at once distinguished from *decorata*, Hagen, of which I have a male before me from Tonkin, by its larger size and more extensively coloured hind wings. Kirby's specimen was

from Wu-chi-shan (Five Finger Mountain), and a long series of additional specimens of the same species, from the same locality, came to the British Museum (Natural History) in 1911, in a collection presented by the Hon. Walter (now Lord) Rothschild. Unfortunately, however, this later series includes only one female, and that lacks the last four segments of the abdomen. I propose to call the Hainan species *Pseudophæa ornata*, sp. n., and proceed to give descriptions of both sexes.

Pseudophæa ornata, sp. n.

1 ♂ (holotype), Wu-chi-shan, Hainan, presented by J. T. Thomasson, 1900.

Figured by Kirby, Ann. & Mag. Nat. Hist. (7) v. pl. xii. fig. 2 (1900).

Length of abdomen 36 + 1 mm.; hind wing 28 mm.

Labium glossy black, the median lobe slightly pruinose.

Labium and clypeus glossy black. Frons, upper surface of head, and antennæ dull black.

Prothorax dull black, with a small orange spot on each side, and with the hind margin narrowly lined with orange.

Meso-metathorax dull black, with six orange lines or stripes on each side of the mid-dorsal carina.

Fore wings suffused with yellowish brown from the base to about the level of the nodus, at which point the colour gradually fades away into a slightly yellowish tinge, which overspreads the wing to the apex. Hind wings yellowish brown in the basal third, dark brown in the middle third (that is, in the dilated area of the wing), followed by a narrow border of yellowish brown; the apical third of the wing with a slightly yellowish tinge. Pterostigma 2.5 mm. long, dark reddish brown. Quadrangle of fore wings with one cross-vein; quadrangle of hind wings with two cross-veins. *M*₂ separating well before the level of the subnodus. [In other specimens *M*₂ may separate at or even after the level of the subnodus.]

Legs black, slightly pruinose.

Abdomen somewhat dilated at base and at apex. Black, the more proximal segments with a tinge of reddish brown. An orange spot on each side of segment 1. An orange line on each side of segment 2. A similar orange line on each side of the proximal third of segment 3. A basal orange spot on each side of segments 4-6.

Superior anal appendages black, slightly forcipate in dorsal view; in lateral view considerably expanded dorso-ventrally, convex externally and concave internally; a large obtuse inferior prominence near the base. Inferior appendages barely visible.

1 ♀ (allotype), Wu-chi-shan, Hainan, 24. v. 1903.

Length of abdominal segments 1-6 20 mm. (7-10 missing) ; length of hind wing 27.5 mm.

Labium dull yellowish brown. Labrum and genæ glossy yellowish brown. Clypeus glossy black. Frons and upper surface of head dull black ; from each of the compound eyes, between the clypeus and antenna, proceeds inwards and slightly upwards a broad transverse stripe of glossy yellowish brown, but not quite meeting its fellow in the middle line of the head ; a rather elongate spot of glossy yellowish brown in front of each lateral ocellus. Antennæ black.

Prothorax dull black, with a large yellowish-brown spot on each side ; the hind margin narrowly lined with yellowish brown.

Meso-metathorax black dorsally (above the first lateral suture) ; two narrow yellowish-brown stripes between the mid-dorsal carina and the humeral suture on each side ; a similar stripe immediately below the humeral suture, and another above and bordering the first lateral suture ; metasternum and metepimeron largely yellowish brown, each marked with a broad longitudinal black stripe, the metepimeron, in addition, having a transverse elongate black spot inferiorly ; the second lateral suture broadly marked with black ; pectus yellowish brown.

Wings mainly hyaline, tinged with brown as far as the nodus in the fore wing and a little beyond the nodus in the hind wing ; the colour most pronounced in the costal and subcostal spaces. Hind wings similar in shape to the fore wings, not dilated as in male. Pterostigma 3 mm. long, dark reddish brown.

Legs black ; femur of mid and hind legs yellowish brown anteriorly.

Abdomen black ; a narrow longitudinal yellowish-brown stripe on each side of segments 1-5. [Segments 7-10 lacking.]

Pseudophæa compar, MacLachlan.

To the same section of *Pseudophæa* which includes *Ps. ornata*—the section, that is, in which the hind wing of the male is expanded and crossed by a band of colour—belongs *Ps. formosa*, described by Hagen from a single imperfect male from the Island of Formosa, received by him from MacLachlan in 1866 [Bull. Acad. Belg. (2) xxvii. p. 660 (1869) ; C. R. Soc. Ent. Belg. xxiii. p. lxiv (1880)]. Apparently in forgetfulness, however, MacLachlan himself described, under the name of *compar*, an almost identical form of *Pseudophæa* from Amoy, in China, of which he had found a male and

female in the British Museum Collection, and compared it, not with the insect he had sent to Hagen, but with *Ps. decorata* of that author (Trans. Ent. Soc. Lond. 1870, p. 167). The types of *compar*, indeed, differ but very slightly from a series of *formosa* with which I have confronted them. The colour-band in the hind wing of *compar* ♂ has some greenish reflections not seen in *formosa*, while in *compar* ♀ the hind wing colour-band is paler than in *formosa* and barely reaches the level of the proximal end of the pterostigma, thus leaving a larger hyaline space at the apex of the wing. Even if these differences should prove to be constant, it is doubtful if they would entitle *compar* to be regarded even so much as a local race of *formosa*.

BIBLIOGRAPHICAL NOTICE.

The Natural History of South Africa. By F. W. FITZSIMONS, F.Z.S. etc.—Birds. 2 vols., pp. xvi + 288 & viii + 323. 10 col. pls., many other illustr. London: Longmans, 1923. 8vo. Price 12s. 6d. each volume.

MR. FITZSIMONS is the Director of the Port Elizabeth Museum in the Cape Province of South Africa, and has already published several books on the natural history of the Union, including four volumes on mammals and two on snakes and snake-bite. Of the two volumes here noticed, the first is almost entirely occupied with a plea for the conservation of birds as a defence against noxious insects, both from the point of view of agriculture and for sanitary reasons, so many insects being now known to be carriers of disease. This is undoubtedly true, but we cannot help thinking that Mr. Fitzsimons's work might have been improved by the compression of this portion of the subject, and the utilization of this space for other matters concerning the structure and life-history of the birds in general.

The second volume contains three lists of South African birds, none of which are really complete and up-to-date. The first one gives an account of the diet of some of the South African birds, the second short descriptions, with notes on distribution and habits, of those illustrated in the plates and figures, and the third a bare list of the names, scientific and vernacular, of all the birds found within the South African limits. This last is based on the work of Stark and Selater, published a good many years ago, and does not appear to have been so thoroughly revised as it should have been by reference to recent literature.

THE ANNALS
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[NINTH SERIES.]

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XXII.—*New or little-known Tipulidæ (Diptera).*—XX. *Australasian Species.* By CHARLES P. ALEXANDER, Ph.D., F.E.S., Massachusetts Agricultural College, Amherst, Massachusetts, U.S.A.

THE species discussed at this time are from Queensland, New South Wales, and Tasmania, and were included in extensive series of crane-flies sent to me for determination by my friends Messrs. Dodd, Ferguson, Illingworth, Robinson, and Séguy. Where not stated to the contrary, the types are preserved in the writer's collection.

GERANOMYIA, Haliday.

PSEUDAPOROSA, subgen. nov.

Characters as in *Geranomyia*, s. s., with the following exceptions: rostrum and paraglossæ combined about as long as the head; maxillary palpi uniaarticulate.

Type of the subgenus: *Geranomyia venustithorax*, sp. n. (Australian subregion).

Geranomyia venustithorax might be referred to either of the genera *Dicranomyia* or *Geranomyia* and appears to be an annectant form. The structure of the mouth-parts would indicate a *Geranomyia* that is on the immediate border-line between this genus and the allies of *Dicranomyia*. The

paraglossæ (which are presumably the labial palpi) are here merely elongate fleshy lobes that are very different in structure from the paraglossæ of other known species of the genus. The subgenus *Monophana*, Edwards, which also has the maxillary palpi reduced to a single segment, has the other mouth-parts of the typical *Geranomyia* form.

Geranomyia (Pseudaporosa) venustithorax, sp. n.

Rostrum very short, paraglossæ about half the length of the head; general coloration yellow; mesonotum with a semicircle of ten black spots, of which six are on the præscutum and four on the scutum; wings yellowish subhyaline, sparsely spotted with brownish black; *Sc* long; abdominal tergites annulated brown and pale yellow.

Male.—Length 6.5 mm.; wing 6.5 mm.

Female.—Length 6.5 mm.; wing 6.3 mm.

Rostrum brownish yellow, elongate, palpi dark brown. Antennæ dark brown, the flagellum paler; flagellar segments submoniliform to rounded oval. Head yellow.

Mesonotal præscutum yellowish laterally, the disk more reddish yellow; six suboval black spots arranged in a semicircle, the two anterior being located before mid-length of the usual median præscutal stripes, the remaining four on the lateral margins; scutum whitish, each lobe with two confluent brownish-black areas, the antero-lateral ones immediately behind the suture; posterior two-thirds of postnotum brown, this including the lateral as well as the median sclerites. Pleura pale, the mesepisternum faintly darkened. Halteres pale. Legs with the coxæ and trochanters faintly darkened; femora, tibiæ, and metatarsi brownish yellow, the tips of the segments narrowly blackened; terminal tarsal segments brown. Wings yellowish subhyaline, with three brownish-black spots located at arculus, at the supernumerary cross-vein in cell *Sc*, and at the origin of *Rs*; stigma paler brown, small, subcircular; cord and outer end of cell 1st *M*₂ indistinctly seamed with darker; veins dark brown, veins *C* and *Sc* more yellowish. Venation: *Sc*₁ ending about opposite mid-length of *Rs*, *Sc*₂ some distance from the tip of *Sc*₁; a supernumerary cross-vein in cell *Sc*; *Rs* about twice the length of the basal deflection of *R*₄₊₅; 1st *M*₂ closed, elongate-rectangular; basal deflection of *Cu*₁ one-half or more of its length beyond the fork of *M*.

Abdomen pale yellowish white, the tergites irregularly annulated with dark brown, this appearing as lateral margins to the segments and a paler brown median stripe, narrowly

connected across the anterior margin of each segment by a pale brown cross-band; sternites pale with only the extreme lateral margins of the segments darkened. Male hypopygium with the basistyles relatively small; ventral dististyle sub-circular in outline, the beak-like rostrum bearing a single powerful spine with an enlarged base; dorsal dististyle short, almost straight, a little curved at tip. Gonapophyses produced apically into a slender, chitinized, slightly curved point.

Hab. North Queensland.

Holotype, ♂, Mossman, October 20, 1920 (*J. F. Illingworth*).

Allotopotype, ♀.

Paratopotypes, 40 ♂ ♀.

The types, which were all taken at light, are preserved in alcohol.

Geranomyia (Geranomyia) penthoptera, sp. n.

General coloration black, the humeral region of the præscutum reddish; wings with a strong brownish tinge; *Sc* long, cell 1st *M*₂ closed.

Male.—Length (excluding rostrum) 5–6.8 mm.; wing 6–6.3 mm.; rostrum about 2.6–3 mm.

Female.—Length (excluding rostrum) 6.4 mm.; wing 6.2 mm.; rostrum 2.8 mm.

Rostrum and palpi brownish black. Antennæ brownish black throughout. Head black, the front and anterior part of the vertex silvery pollinose, this coloration continued as a narrow line on to the vertex, but becoming obsolete before the occiput.

Pronotum black, reddish posteriorly. Mesonotum black, the humeral regions of the præscutum broadly reddish. Pleura dark brown, the ventral sclerites and the sternum more reddish. Halteres brown, the base of the stem yellow. Legs with the coxæ yellow, the mid and hind coxæ more or less infuscated; remainder of the legs dark brown, the fore femora paler at bases. Wings with a strong brownish tinge; cell *Sc*₁, the wing-tip, and the stigma slightly darker brown; veins dark brown. Venation: *Sc* long, *Sc*₁ extending to just before the end of the long sector, *Sc*₂ at the tip of the long *Sc*₁; *Rs* longer than the basal section of *R*₂₊₃; *r-m* shorter than *m*; cell 1st *M*₂ closed; basal deflection of *Cu*₁ at or close to the fork of *M*.

Abdomen dark brownish black, the sternites paler, more reddish brown.

In the female the mesonotum is reddish with only the median area black; femora paler than in the male.

Hab. North Queensland.

Holotype, ♂, Babinda, October 30, 1920 (*J. F. Illingworth*).

Allotopotype, ♀, October 1920.

Paratopotypes, 3 ♂♂ with type; 1 ♀, October 1920.

"Scrub stream near water."

Geranomyia (Geranomyia) manca, sp. n.

General coloration shiny black, the front and thoracic pleura silvery pruinose; wings hyaline; *Sc* long; cell 1st M_2 open by the atrophy of *m*.

Female.—Length (excluding rostrum) 5.5–6.3 mm.; wing 5.5–6.2 mm.; rostrum about 3–3.2 mm.

Rostrum, palpi, and antennae black. Head grey-pruinose, more silvery on front and anterior part of vertex.

Mesonotum shiny black, the praescutum on sides silvery. Pleura black, heavily silvery pruinose; sternum yellowish testaceous. Halteres whitish yellow. Legs greenish testaceous basally, the remainder dark brown. Wings hyaline; stigma small, oval; veins brownish black. Venation: *Sc* long, Sc_1 ending about opposite four-fifths of the length of *Rs*; Sc_2 a short distance from the tip of Sc_1 ; a supernumerary cross-vein in cell *Sc*; *Rs* about twice the basal deflection of R_{4+5} and a little longer than the basal section of R_{2+3} ; $r-m$ longer than the basal deflection of M_{1+2} ; cell 1st M_2 open by the atrophy of *m*; basal deflection of Cu_1 some distance beyond the fork of *M* and a little longer than Cu_2 alone.

Abdomen dark brown, the sternites yellowish testaceous.

Hab. North Queensland.

Holotype, ♀, Babinda, November 10, 1920 (*A. P. Dodd*).

Paratopotypes, 3 broken ♀♀, October 1920 (*J. F. Illingworth*).

"On scrub foliage."

Limonia semitristis, sp. n.

General coloration dark brown, sparsely pruinose; tips of femora dark brown; wings faintly infuscated, stigma subcircular, dark brown; wing-tip and cord faintly darkened; *Sc* long, Sc_2 at tip of Sc_1 ; abdominal segments narrowly margined caudally with yellowish.

Male.—Length 7 mm.; wing 6.5 mm.

Female.—Length 7.5 mm.; wing 7 mm.

Rostrum, palpi, and antennæ dark brown. Head dark brown, pruinose; front and anterior part of vertex more silvery.

Mesonotum brownish grey, the præscutum without distinct stripes. Pleura dark brown, pruinose, with a brighter silvery longitudinal stripe above the bases of the coxæ. Halteres dark brown, the basal half of the stem yellow. Legs with the coxæ and trochanters brownish testaceous; femora brownish testaceous, the tips broadly dark brown; tibiæ and tarsi brown, the terminal tarsal segments darker. Wings with a slight infuscation, cell *Sc* more yellowish; stigma subcircular, dark brown; wing-tip and the veins along the cord and outer end of cell 1st *M*₂ slightly infuscated; veins dark brown. Venation: *Sc* long, *Sc*₁ ending opposite mid-length of the deflection of *R*₄₊₅; *Sc*₂ at tip of *Sc*₁; *r* at tip of *R*₁; *Rs* arcuated, about twice the basal deflection of *R*₄₊₅; basal deflection of *Cu*₁ at or beyond mid-length of cell 1st *M*₂.

Abdomen brownish black, the caudal margin of the segments narrowly pale; anterior margins of basal sternites broadly pale, especially in the female.

Hab. North Queensland.

Holotype, ♂, Kuranda, November 30, 1920 (*A. P. Dodd*).

Allotopotype, ♀, on tree-trunk.

Paratopotypes, 2 ♀ ♀.

Limonia semitristis is closely allied to *L. bidentata* (Skuse), differing in the details of coloration and venation, especially the longer *Sc* and the different course of the veins around the stigma.

Trentepohlia (Mongoma) tarsalis, sp. n.

General coloration brown, the thoracic pleura more yellowish; legs dark brown, the tarsi snowy-white; mid-tibiæ feathered, somewhat as in *T. pennipes* (Osten-Sacken).

Female.—Length 8.4 mm.; wing 6.7 mm.

Rostrum and palpi brown. Antennal scape brownish testaceous, the flagellum dark brown. Head dark grey, the occiput ochreous.

Mesonotum shiny brown, becoming paler laterally, the scutum obscure yellow. Pleura shiny brownish yellow. Halteres pale brown, the base of the stem yellow. Legs with the coxæ and trochanters yellowish testaceous; femora and tibiæ brown, the tips of the latter rather broadly (2 mm.) snowy-white, the mid-tibiæ feathered; tarsi white. Wings pale yellowish grey, the stigma yellow, ill-defined; veins

brown. Venation: second section of R_{2+3} equal to or a little shorter than R_2 alone; fusion of Cu_2 and 1st A longer than m .

Abdomen dark brown. Ovipositor with the tergal valves slender, strongly upcurved.

Hab. North Queensland.

Holotype, ♀, Gordonvale, November 19, 1920 (*A. P. Dodd*).

Styringomyia terræ-reginæ, sp. n.

General coloration black; posterior femora with a broad china-white subterminal ring; wings strongly infumed, with a broad but incomplete hyaline band before the cord.

Male.—Length 6·8 mm.; wing 4·3 mm.

Rostrum dark brown, the palpi paler. Antennæ with the first segment black, the remainder of the organ more brownish. Head black, paler anteriorly.

Thorax black, the mesonotal præscutum indistinctly paler medially. Halteres dark brown. Legs with the coxæ black; trochanters brown; femora black, the fore femora paler at base, the posterior femora with a broad china-white ring before the equally broad black apex; tibiæ and tarsi black, the extreme bases of the segments narrowly paler. Wings with the cephalic distal portion strongly infumed, the remainder of the wing-disk less strongly infuscated; a conspicuous hyaline area across the sector, including cells R_1 , R_2 , and M ; the bases of cells Cu and 1st A are also paler; veins brown. Venation: as in the genus, but vein and cell 2nd A longer than usual.

Abdomen black, including the hypopygium.

Hab. North Queensland.

Holotype, ♂, Gordonvale, November 1920 (*A. P. Dodd*).

“Ex scrub.”

Dolichopeza longidigitalis, sp. n.

Male.—Length 8–9 mm.; wing 10·5 mm.

Female.—Length 12–13 mm.; wing 11·5–12 mm.

Generally similar to *D. planidigitalis*, Skuse, from which it differs as follows: median præscutal stripe distinctly split by a pale line except at the posterior end. Stigma less distinct. Abdominal segments not distinctly annulate. Digitiform appendage of male hypopygium longer, gently curved mesad near mid-length, the apex weakly dilated and bearing numerous long setæ, especially on the inner face.

Hab. New South Wales.

Holotype, ♂, Blue Mountains, February 26, 1922 (E. W. Ferguson).

Allotopotype, ♀, March 11, 1922 (E. W. Ferguson).

Paratopotypes, 5 ♂ ♀, with the type.

I am indebted to Dr. Ferguson for a comparison of specimens of this species with the type of *D. planidigitalis*. He writes: "Seems an undescribed species of *Dolichopeza*. I have compared it with the type of *D. planidigitalis*, but it differs in the longer, more curved forceps. The drawing by Skuse of the forceps of *D. planidigitalis* is quite accurate."

Type returned to Dr. E. W. Ferguson.

Plusiomyia nasalis, sp. n.

General coloration orange-yellow, the dorsum of the mesonotal præscutum and scutum black; flagellar segments tripectinate; frontal prolongation of the head not in alignment with the remainder of the frons; nasus distinct; legs black, the bases of the femora and tibiæ broadly orange; wings with a faint brown tinge.

Male.—Length about 20 mm.; wing 16 mm.

Frontal prolongation of the head yellow, moderately elongate, with a distinct stout nasus; the frontal prolongation is not in alignment with the frons, which it meets at an acute angle; palpi brownish yellow. Antennæ with the scape obscure brownish yellow; flagellar segments light brown with black pectinations; flagellar segment 1 has a single pectination that is about one-third longer than the segment; flagellar segments 2 to 8 are tripectinate, the basal pair of pectinations long and slender, about three times the length of the segment that bears them; the third pectination of each segment is situated immediately beyond mid-length on the basal segments, on the succeeding segments nearer the distal end of the segment, on the eighth segment being far out toward the tip; this third pectination is approximately as long as the segment that bears it, except on the elongate eighth flagellar segment; terminal segments simple. Head with the centre of the vertex dark brown, passing into fulvous on the genæ and front; vertical tubercle present.

Pronotum obscure orange. Mesonotal præscutum and scutum dull black, the small humeral angles and lateral margins of the former obscure fulvous; scutellum and postnotum reddish brown; tubercle on lateral sclerite of postnotum very conspicuous, the sides of the sclerite rugulose.

Pleura reddish brown, sparsely pruinose, the dorso-pleural membrane orange. Halteres obscure yellow, the knobs brown with obscure yellow tips. Legs with the coxæ pale brown, sparsely pruinose; trochanters obscure orange; femora obscure orange, the tips broadly and conspicuously black; tibiæ with about the basal half obscure yellow; remainder of tibiæ and tarsi black. Wings faintly tinged with brown; cells *C* and *Sc* dull yellow; stigma small, elongate-oval, dark brown; veins brownish black. Venation: *r* uniting with *R*₂ just beyond the fork, so the terminal section of *R*₂ is not in alignment with *r*; petiole of cell *M*₁ a little longer than *m*.

Abdomen with the basal tergite dull dark brown; remaining tergites and sternites orange-yellow, pubescent; second tergite glabrous except on the distal third, where it is faintly darkened medially.

Hab. New South Wales and Queensland.

Holotype, ♂, Mt. Tambourine, South Queensland, altitude 2000 feet, February 1922 (*A. P. Dodd*).

Paratype, ♂, Rous, Richmond River, New South Wales, April 1, 1923 (*V. J. Robinson*).

Ischnotoma episema, sp. n.

General coloration buffy, the præscutum with four brown stripes; pleura grey; femora and tibiæ reddish brown, the tips narrowly blackened; wings whitish subhyaline, the cells beyond the cord infuscated, the ground-colour extending to the wing apex in cell *R*₆.

Female.—Length 17–18 mm.; wing 17.5–18 mm.

Frontal prolongation of the head relatively long and slender, light brown, greyish dorsally; nasus distinct; palpi black. Antennæ with the scapal segments buffy, the flagellum black. Head ashy grey, the anterior part of the vertex and the orbits narrowly paler.

Mesonotal præscutum buffy with four brown stripes, the long intermediate pair widely separated from one another by a line of the ground-colour; lateral stripes with an indistinct capillary vitta; pseudosutural foveæ reduced to an impressed line, its inner end expanded into a shiny pit; scutum dull grey, the lobes largely brownish black; scutellum black, more greyish behind; postnotum dark grey with a broad brown basal triangle, the point directed caudad. Pleura light grey. Halteres dark brown, the base of the knobs faintly paler. Legs with the coxæ light grey; trochanters reddish yellow; femora reddish brown, the tips

rather narrowly blackened; tibiæ light brown, the tips narrowly blackened; tarsi black. Wings whitish subhyaline, the cells beyond the cord infuscated, leaving most of the cell R_5 , all of 1st M_2 , and the broad bases of cells M_1 , 2nd M_2 , M_3 , and Cu_1 of the ground-colour; stigma brown, the proximal end darker; cell Sc dark brown; a brown seam along vein Cu and the basal deflection of Cu_1 ; anal cells faintly darkened; tip of cell 1st A at vein 1st A subhyaline; veins dark brown, pale in the obliterative areas. Venation: m a little shorter than the petiole of cell M_1 .

Abdominal tergites brown, the caudal margins of the segments narrowly pale; sternites paler brown. Ovipositor with the dorsal shield shiny chestnut-brown.

Hab. New South Wales.

Holotype, ♀, Mt. Kosciusko, December 5, 1921 (*Waterhouse*).

Paratopotypes, 1 ♀, with the type; 1 ♀, December 7, 1922 (*Goldfinch*).

Type returned to Dr. E. W. Ferguson.

Ischnotoma scutellum-nigrum, sp. n.

General coloration brown; orbits broadly light grey; mesonotal præscutum golden-yellow with three dark brown stripes; scutellum dark; legs black, the femoral bases conspicuously fulvous; wings tinged with brown, without distinct markings, the prearcular region strongly yellowish.

Male.—Length 12.5–13 mm.; wing 16–16.5 mm.

Female.—Length 15 mm.; wing 16 mm.

Frontal prolongation of the head black, sparsely pruinose, more heavily dorsally; nasus distinct; palpi black. Antennæ brownish black throughout, the scapal segments a very little paler; basal segment of scape with transverse constrictions. Head dark brown, the front and posterior orbits broadly light grey, the anterior orbits narrowly of the same colour.

Pronotum brown. Mesonotal præscutum light golden-yellow with three very distinct dark brown stripes, the median stripe narrowly and indistinctly divided by an opaque line of the same colour; pseudosutural foveæ represented by a delicate line, its inner end expanded into a small point; scutum dark brown, the median area and a narrow line near the wing-root light grey; scutellum brownish black, the lateral portions pruinose; postnotum with the mediotergite light grey, the posterior third darkened; a conspicuous dark brown median triangle, the point directed caudad; pleurotergite largely dark brown, with an oval grey area immediately cephalad of the base of the halter. Pleura light

grey, the dorso-pleural membrane weakly darkened, more buffy surrounding the spiracle; a narrow brown longitudinal stripe delimits the sternopleura from the pteropleura. Halteres brown, the knobs darker. Legs with the coxæ light grey; trochanters orange, weakly pruinose; femora black, the bases conspicuously fulvous, this a little more extensive on the posterior legs; remainder of the legs black. Wings with a strong brownish tinge, but without distinct markings; wing-base strongly flavous; stigma darker brown; weak subhyaline areas before and beyond the stigma and across the base of cell 1st M_2 ; brown seams along vein Cu and its branches, and less distinctly on the longitudinal veins beyond the cord; veins brownish black. Venation: m a little longer than the petiole of cell M_1 .

Abdomen dark brown, the caudal margins of the tergites narrowly, the lateral margins more broadly, greyish yellow; sternites similar, the posterior margins narrowly pale; hypopygium dark. Ovipositor with the dorsal shield blackened, the valves horn-coloured.

Hab. New South Wales.

Holotype, ♂, Mt. Kosciusko, December 5, 1921 (*Waterhouse*).

Allotopotype, ♀.

Paratopotype, ♂, December 7, 1922 (*Goldfinch*).

Type returned to Dr. E. W. Ferguson.

Ischnotoma immaculipennis, sp. n.

General coloration light grey; mesonotal præscutum with four relatively narrow dark brown stripes, the intermediate pair narrowly separated by a dark grey line; lateral margins of the sclerites light yellow; wings pale brownish subhyaline, the stigma a little darker; abdomen brownish ferruginous, the subterminal segments blackened.

Female.—Length about 14 mm.; wing 15 mm.

Frontal prolongation of the head relatively stout, the snus long and slender, yellow dorsally, becoming darker on the sides; palpi black, the basal segment paler. Antennæ with the scape fulvous, the flagellum black; flagellar segments only ten in number, the basal six segments incrassated, the terminal four segments attenuate, especially the terminal two. Head brown, the orbits and genæ narrowly silvery.

Mesonotal præscutum light yellow with four relatively narrow dark brown stripes, the intermediate pair narrowly separated by a dark grey line; scutum dark grey, each lobe

with a brown centre; scutellum brown, pruinose; postnotum light grey with a basal median dark brown triangle, the point directed caudad. Pleura light grey-pruinose, including the ventral half of the mesonotal pleurotergite. Halteres dark brown, the base of the stem narrowly obscure yellow. Legs with the coxæ light grey-pruinose; trochanters yellow; femora yellow, the tips conspicuously blackened; tibiæ brownish yellow, the tips narrowly blackened; tarsi brown, passing into black. Wings pale brownish subhyaline; cell *Sc* faintly darkened; stigma pale brownish yellow; veins brown. Venation: distal section of vein R_2 in alignment with the short basal section; veins R_2 and R_3 widely divergent; veins R_3 and R_{4+5} widely divergent at outer ends, the latter ending at the wing-tip; cell 1st M_2 pentagonal, the long sides parallel; petiole of cell M_1 a little longer than m .

Abdomen with basal tergites (1 to 4) brownish ferruginous, the basal segments with a brown spot on either side; segments 5 to 8 black with the caudal margins of the segments very narrowly and indistinctly pale; genital segment ferruginous; sternites generally similar, but the caudal margins of the subterminal segments broadly yellow.

Hab. New South Wales.

Holotype, ♀, Blue Mountains, January 22, 1922 (*E. W. Ferguson*).

Type returned to Dr. E. W. Ferguson.

Macromastix macquartiana, sp. n.

Male.—Length 12–13 mm.; wing 17–19 mm.; antenna 23–24 mm.

Female.—Length 13 mm.; wing 18 mm.; antenna 2–2.3 mm.

Very similar to *M. costalis* (Swederus), differing chiefly in the shorter antennæ in the male sex. In *costalis* these measure approximately 2 inches in length, whereas in this new species they extend slightly less than 1 inch. The flagellar segments in *costalis* gradually increase in length distally, whereas in *macquartiana* they gradually shorten beyond the second; this is shown by the accompanying table:—

Species.	Flag. segs. in mm.					
	1.	2.	3.	4.	5.	6.
<i>costalis</i>	2.7	4.8	5.2	5.9	6	6.3
<i>macquartiana</i>	1.8	3.2	3	2.8	2.6	2.5

Other slighter differences between the two species are as

follows: *M. macquartiana* has the vertical tubercle a little shorter and less conspicuous; præscutal stripes less clearly delimited; stigma more yellowish, contrasting with the yellowish-brown costal margin of the wings; *Rs* a little longer.

Hab. Tasmania.

Holotype, ♂, Hobart.

Allotopotype, ♀.

Paratopotype, ♂; *paratypes*, numerous specimens from Macquart's collection (*Verreaux*), in the Paris Museum.

Additional specimens from a locality that I have not recorded in my notes are in the British Museum, and were kindly sent to me by Mr. Edwards.

Macquart's type-specimen of *Macromastix limbipennis* (Dipt. Exot. i. pt. 1, p. 60, pl. vi., as *Megistocera*, 1838) was a single male, from an unknown locality, in which only the two basal segments of the antennal flagellum remained intact. From Macquart's figures it is to be seen that the type of *limbipennis* must be referred to the synonymy of *M. costalis*, a course that has been followed by all recent workers on the group. In the First Supplement to his work (Supplement 1, p. 17, pl. n. fig. 3, 1846), however, Macquart has added notes and figures on supplementary material taken in Tasmania by Verreaux, and all these later specimens refer to the species described herewith as *M. macquartiana*, in honour of the distinguished Dipterologist. I am indebted to Mons. E. Séguéy for the privilege of examining several of these Verreaux specimens in collections of crane-flies belonging to the Paris Museum.

Macromastix albicollis, sp. n.

Mesonotum brown, the pronotum conspicuously whitish; vertex light grey; wings strongly tinged with brown; cells *C*, *Sc*, and stigma darker; conspicuous obliterative areas before and beyond the stigma; cell *M*₁ sessile or nearly so.

Female.—Length about 9 mm.; wing 13 mm.

Frontal prolongation of the head dark brown throughout, relatively short and stout, with a long powerful nasus. Antennæ with the scapal segments cream-yellow, the first a little darker dorsally at the base; flagellum dark brown, all segments beyond the basal three slender. Head dark brown, the vertex conspicuously light grey; vertical tubercle feebly notched.

Pronotum conspicuously whitish. Mesonotal præscutum uniform rather light brown, the lateral margins darker

Brown; scutum concolorous; scutellum testaceous, the median lobe sparsely pruinose; postnotum dark brown, the anterior half passing into black. Pleura yellow, the posterior pleurites passing into dark brown; dorsal pleural region slightly infuscated; sternopleura and base of fore coxa weakly infuscated, sparsely pruinose. Halteres obscure yellow, the knobs dark brown. Legs with the coxæ obscure yellow; trochanters yellow, each with a black apical spot beneath; femora yellow, the tips conspicuously blackened; tibiæ obscure brownish yellow, the tips narrowly infuscated; tarsi obscure yellow, passing into brown. Wings strongly tinged with brown; cells *C*, *Sc*, and the stigma darker brown; prearcular region conspicuously yellowish; a conspicuous uninterrupted obliterative area extending from before the stigma in cell *C* across the base of cell 1st *M*₂ into cell *M*₃; veins dark brown. Venation: *m* oblique in position, giving the outer end of cell 1st *M*₂ a conspicuous point; cell *M*₁ sessile to short-petiolate; cell 2nd *A* moderately broad.

Abdominal tergites dark brown, the extreme caudal margins of the segments indistinctly pale; basal sternites yellow, the caudal margins of the segments narrowly infuscated, the amount increasing on the outer segments, which become unicolorous brown. Ovipositor with the fleshy valves hairy, the blunt tergal valves separated from one another by a V-shaped notch, covered with short silvery hairs; sternal valves very densely clothed with long golden-brown setæ.

Hab. New South Wales.

Holotype, ♀, Blue Mountains, February 12, 1922 (*E. W. Ferguson*); collector's No. 11.

Paratopotype, ♀, March 4, 1922 (*E. W. Ferguson*).

Type returned to Dr. E. W. Ferguson.

Macromastix dorrigensis, sp. n.

Female.—Length about 8.5 mm.; wing 12 mm.

Scapal segments conspicuously paler than the dark brown flagellum. Anterior half of vertex conspicuously orange. Pronotum and mesonotum obscure brown, the præscutum more testaceous medially, without distinct stripes; scutellum more testaceous. Wings distinctly tinged with brown; stigma oval, darker brown. Venation: petiole of cell *M*₁ two-thirds the length of *m*. Coloration of abdomen nearly obliterated by distension with eggs.

The species is closely related to *M. tortilis*, Alexander, *M. hackeri*, Alexander, and *M. brevipetiolata*, Alexander, but

must be considered as being distinct from all. The short stout frontal prolongation of the head, with a long tufted *nasus*, distinguishes the group from similar species with longer frontal prolongations. *M. tortilis* and *M. hackeri* have the coloration brighter yellow, the head yellow, not conspicuously darkened posteriorly. *M. tortilis* has the wings more yellowish, with the costal area faintly darkened, especially basally; R_3 , in proportion to R_2 , is considerably longer; cell 2nd A broader. *M. hackeri* has the wings more yellowish; cell 2nd R_1 larger; R_3 slightly shorter. *M. brevipetiolata*, which resembles the present species more closely in the general coloration of the body and wings, has the stigma paler, yellowish, scarcely evident; petiole of cell M_1 very short to almost obliterated; cell 1st M_2 larger.

Hab. New South Wales.

Holotype, ♀, Loowanna, Eastern Dorriggo, January 31, 1923 (*E. W. Ferguson*).

Type returned to Dr. E. W. Ferguson.

Macromastix hackeri, Alexander.

1920. *Macromastix hackeri*, Alexander, Mem. Queensland Mus. vii. pp. 62, 63.

The type-locality was Brisbane, Queensland. Dr. Ferguson has sent me a male, taken in East Dorriggo, New South Wales, January 30, 1923, by himself. This specimen differs from the alcoholic type in the following regards: scapal segments yellow, the flagellar segments more infuscated. Head orange, yellowish orange on the low vertical tubercle. Mesonotum shiny obscure yellow. Femoral apices scarcely infuscated. Proximal end of stigma in cell Sc_1 darker brown than the remainder of the stigma; Rs , R_{2+3} , and R_2 straighter.

Macromastix aurantioceps, sp. n.

General coloration obscure yellow with three conspicuous dark brown stripes on præscutum; frontal prolongation of head relatively short, *nasus* distinct; vertical tubercle of head orange; femoral tips narrowly but conspicuously blackened; wings strongly tinged with brown, cell Sc darker brown; oblitative areas before and beyond the stigma and across the base of cell 1st M_2 ; abdomen brownish fulvous, the posterior half of the segments with a transverse black band or triangle.

Female.—Length 10–11 mm.; wing 12·5–15 mm.

Frontal prolongation of head relatively short and stout, obscure yellow, the dorsum more infuscated; nasus short and stout, tufted with long dark setæ; palpi dark brown. Antennæ with the basal segment ochreous; second segment brown; flagellum with the basal segment pale brown, the terminal segments darker brown; flagellum short. Vertical tubercle entire, large and conspicuous, bright orange, the posterior part of vertex and the genæ slightly more infuscated.

Pronotum obscure yellow medially, slightly darker laterally. Mesonotal præscutum obscure yellow with three conspicuous dark brown stripes, the broad median stripe faintly divided by a capillary pale line; humeral region dark brown along the margins; scutum yellowish brown, each lobe with two darker brown areas; scutellum and postnotum obscure brownish yellow, the posterior margin of the latter dark brown. Pleura testaceous yellow, the dorsal pleurites a little darker. Halteres dark brown, the base of the stem obscure yellow. Legs with the coxæ obscure yellow, the trochanters brighter yellow; femora testaceous yellow, the tips rather narrowly but conspicuously blackened; tibiæ light brown, passing into dark brown towards the tips; tarsi brownish black. Wings strongly tinged with brown; wing-base strongly flavous; cell *Sc* and stigma darker brown; base of costal cell slightly infuscated; yellowish obliterative areas before and beyond the stigma and across the base of cell 1st M_2 , the latter including portions of cells *M*, 1st M_2 , 2nd M_2 , and M_3 ; veins dark brown. Venation: *R*₃ about three-fourths *R*₂₊₃; *r* more than its own length beyond the base of *R*₂; petiole of cell M_1 shorter than *m*; *m-cu* obliterated by fusion of adjoining veins; cell 2nd *A* relatively short and narrow.

Abdominal tergites obscure brownish fulvous, each with a conspicuous black triangle, the broad base occupying the caudal margin, the narrow apex extending to the anterior margin of the segment; sides of segments 1 and 2 broadly pale; tergites 7 and 8 largely pale; sternites yellow with median infuscations. Ovipositor with fleshy valves, the sternal valves with conspicuous setæ.

The smaller paratype differs in some regards but is almost certainly conspecific; flagellar segments dark brown; sides of vertex adjoining the posterior margins of eyes strongly infuscated. The thorax has been hollowed out, rendering the præscutal stripes little evident and the surface strongly shiny where it is dull in the type. The abdominal bands are transverse, giving the abdomen a dimidiate appearance.

Hab. New South Wales.

Holotype, ♀, Megan, Eastern Dorrigo, January 30, 1923 (*E. W. Ferguson*).

Paratype, ♀, Glenreagh, Dorrigo, February 2, 1923 (*E. W. Ferguson*).

Type returned to Dr. E. W. Ferguson.

Macromastix aurantioiceps subnitida, subsp. n.

Female.—Length about 10–11 mm.; wing 15–16 mm.

Generally similar to typical *aurantioiceps*, from which it differs as follows :—

Size larger. Frontal prolongation of head brighter-coloured. Basal segments of the antennal flagellum yellowish. Mesonotal præscutum with the surface subshiny, reddish yellow, with three darker stripes indicated posteriorly. Wings with the prearcular cells darker; costal cell dark, at the base as dark as the subcostal cell, becoming a little paler toward the stigma; stigma including all of cell 2nd R_1 . Venation: *Rs* straighter, subequal to or longer than R_{2+3} .

Hab. New South Wales.

Holotype, ♀, Blue Mountains, January 22, 1922 (*E. W. Ferguson*).

Paratopotypes, 2 ♀ ♀, February 24–March 4, 1922 (*E. W. Ferguson*).

Type returned to Dr. E. W. Ferguson.

Macromastix fergusonii, sp. n.

General coloration light grey; mesonotal præscutum with three dark brown stripes; halteres elongate; legs black, the femoral bases narrowly fulvous; wings subhyaline, cells *C* and *Sc* brown, the base light yellow; tip of vein R_2 atrophied.

Male.—Length about 9 mm.; wing 13 mm.

Frontal prolongation of the head dark brown above, slightly paler laterally; palpi black; nasus indistinct. Antennæ short, black throughout; basal flagellar segment about one-half longer than the second. Head dark brown, the vertex surrounding the antennal bases and the orbits paler.

Mesonotal præscutum brownish grey, clearer grey near the suture, with three dark brown stripes, the median stripe feebly bifid on posterior half; scutum light grey with two confluent rather ill-defined brown spots on each lobe; scutellum and postnotum light grey. Pleura light grey, the dorso-pleural membrane infuscated. Halteres elongate, dark

brown. Legs with the coxæ light grey; trochanters brown; remainder of legs brownish black, the femoral bases narrowly and obscurely fulvous. Wings subhyaline; cells *C* and *Sc* dark brown; stigma pale; prearcular region conspicuously light yellow; longitudinal veins indistinctly clouded with darker to give the wing a faintly streaked appearance; veins dark brown. Venation: tip of *R*₂ atrophied; *m* variable, from longer than to a little shorter than the petiole of cell *M*₁; *m-cu* punctiform or barely obliterated, near mid-length of cell 1st *M*₂.

Abdomen dark brown or brownish black, the posterior margins of the segments in some cases paler; hypopygium obscure fulvous.

Hab. New South Wales.

Holotype, ♂, Blue Mountains, April 17, 1922 (*E. W. Ferguson*).

Paratopotypes, 5 ♂♂, with the type.

Type returned to Dr. E. W. Ferguson.

This interesting crane-fly is dedicated to the collector, Dr. Eustace W. Ferguson, to whom I am greatly indebted for many favours.

Macromastix luteicosta, sp. n.

Male.—Length 10–11 mm.; wing 13·5–14·5 mm.

Generally similar to *M. fergusoni*, from which it differs as follows: size somewhat larger. Head brighter-coloured, especially on or near the vertical tubercle, which is feebly bifid. Wings greyish subhyaline with cells *C* and *Sc* yellow, a little duller than the bright base; stigma pale brown. Distal section of vein *R*₂ entirely atrophied.

Hab. New South Wales.

Holotype, ♂, Blue Mountains, April 17, 1922 (*E. W. Ferguson*).

Paratopotypes, 3 ♂♂, April 13–15, 1922.

Type returned to Dr. E. W. Ferguson.

Dr. Ferguson supplies the following notes:—

"These two species (*M. fergusoni* and *M. luteicosta*) made their appearance at Blackheath about the beginning of April and became very numerous. The two species were found in different situations, *M. luteicosta* on the higher parts and *M. fergusoni* on the slopes. I walked down to Govett's Leap one afternoon (about two miles from the house I was staying in); it had been raining hard and was still misty, and the path which ran alongside the main road

but through the bush was still a running stream. *M. fergusoni* was present in thousands all along this path, all males, and in the trickle on the path I came across five specimens of a wingless Tipulid, which at first I thought might be the female of this species." The last statement will very probably be found to be correct, but it is better to find the flies *in copula* before describing the female as this sex of *M. fergusoni*. The occurrence of subapterous females of winter species of *Macromastix* in New Zealand is now well known.

XXIII.—*A new Trematode from the Grass-snake.* By H. A. BAYLIS, M.A., D.Sc., and H. GRAHAM CANNON, M.A.

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[Plate VI.]

THE Trematode described in the following account was found in considerable numbers in two specimens of the grass-snake (*Tropidonotus natrix*) dissected in the Zoological Department, Imperial College of Science, in June 1923. Upon inquiry it was found that the snakes had been collected in Tuscany. The worms occurred mainly in the œsophagus, but a few were found in the stomach.

The species may be referred to the family Lepodermatidæ, Odhner, 1911, and appears to be very closely related to the type-genus, *Lepoderma*, Looss, 1899 (= *Plagiorchis*, Lühe, 1899), from which it differs chiefly in the disposition of the ascending and descending limbs of the uterus. In *Lepoderma* these both pass between the testes, whereas in the form here described they pass laterally to the testes. In this respect our form differs from the majority of the genera included in the family, but it would seem more reasonable to emend the family diagnosis, provisionally at least, to include it, than to exclude it rigidly on this ground. The difference in the arrangement of the uterus (which is seen in an incipient condition in *Opisthioglyphe*) is correlated with, and probably a consequence of, the median position of both testes. After considerable hesitation we have thought it advisable to make the species, of which a description follows, the type of a new genus.

Encyclometra natrix, gen. et sp. n.

Body flattened, oval, measuring 3.17–4.5 mm. in length

and 1.1–1.75 mm. in width, and terminating in a small protuberance posteriorly. Cuticle unarmed. Oral sucker subterminal, 0.46–0.66 mm. in diameter. Ventral sucker at about the commencement of the middle third of the body, slightly larger than the oral sucker (diameter 0.49–0.78 mm.). Pre-pharynx short, extending just beyond the posterior margin of the oral sucker. Pharynx constricted anteriorly so as to appear pear-shaped, measuring 0.26–0.4 mm. in length and 0.22–0.3 mm. in width. Oesophagus absent, the gut bifurcating immediately behind the pharynx. Gut-branches reach to about the posterior eighth of the body. Genital pore a little in front of the anterior margin of the ventral sucker and considerably to the left of the median plane. Cirrus-sac extends transversely from the genital pore in front of the sucker, usually about as far as the middle line, where it curves posteriorly. It contains a pars prostatica and a large internal vesicula seminalis, which is constricted in the middle. Testes situated close together in the median plane, one behind the other, midway between the ventral sucker and the posterior end of the body, and measuring 0.3–0.4 mm. in diameter. Ovary situated at the level of the posterior margin of the ventral sucker, a little to the right of the median plane, and measuring 0.22×0.18 mm. to 0.3×0.2 mm. Laurer's canal present, much convoluted, opening approximately above the left posterior margin of the ventral sucker. Uterus extends with many convolutions to the posterior end of the body, passing round the testes and not between them. It passes down the right side of the body from the level of the ovary, occupies the space between the posterior testis and the hinder end of the body, and then runs up the left side to the genital pore. Its lateral loops do not extend beyond the gut-branches. Yolk-glands extend from the level of the posterior margin of the ventral sucker to the posterior end of the body. Their ducts cross the body immediately behind the ventral sucker. The follicles of the yolk-glands are mostly situated laterally to the gut-branches, but some of them extend inwards slightly on the ventral side. Excretory pore opens on the posterior protuberance. Excretory bladder Y-shaped, with short, rounded arms embracing the posterior border of the ventral sucker. Its main stem is very voluminous, occupying, in immature specimens, the whole space between the gut-branches and between the ventral sucker and the posterior end.

The form described above cannot, we believe, be identified with any of the thirty species of Trematoda recorded from

snakes of the genus *Tropidonotus*, of which descriptions are accessible to us. It is certainly distinct from *Lepoderma* [*Plagiorchis*] *mentulatum* (Rud.), which occurs in *Tropidonotus natrix* and *T. tessellatus*, though bearing certain general resemblances to this form. The most obvious points in which it differs from it are (1) its much larger size; (2) the tandem arrangement of the testes, which in *L. mentulatum* are diagonally placed; (3) the extent of the yolk-glands, which here do not extend anteriorly beyond the ventral sucker, while in *L. mentulatum* they reach the level of the pharynx; and (4) the arrangement of the uterus already referred to.

Distomum allostomum, Diesing, 1850, which is recorded from *Tropidonotus natrix*, is so briefly described that its identification is probably impossible except by re-examination of the type-material, if such still exists.

Two forms, occurring in European snakes other than *Tropidonotus*, seem to approach rather closely to our species. *Distomum subflavum*, Stossich, 1892*, from *Zamenis viridiflavus*, has the testes placed tandem and the yolk-glands, as in our form, extending from the ventral sucker to the posterior end. In other respects the description of *D. subflavum* is very incomplete. Its size, however (8 mm. in length and 2 mm. in width), is almost twice that of our largest specimens, and it seems improbable that the species are identical. *Distomum sauremates*, Poirier, 1886† (which is referred to *Plagiorchis* by Stossich, and presumably is a *Lepoderma*), from *Coluber quatuorlineatus*, is of about the same size as our species, but its yolk-glands extend only from the anterior margin of the ventral sucker to the posterior testis, its genital pore is at the level of the pharynx, its testes are not tandem and the uterus passes between them.

EXPLANATION OF PLATE VI.

Encyclometra natrix. Ventral view, from a stained whole preparation in balsam.

XXIV.—*A new Sitatunga from Central Africa*. By EINAR LÖNNBERG, F.M.Z.S. &c., and NILS GYLDENSTOLPE, C.M.Z.S.

[Plate VII.]

AMONG the collections of the Swedish Zoological Expedition to Central Africa (1921) there is a *Sitatunga* or Marsh-

* Atti Soc. Tosc. Sci. Nat., Pisa, viii. p. 91.

† Bull. Soc. Philomat. Paris, (7) x. p. 24.

Antelope, which, to all appearance, represents a new subspecies, and which we therefore take the opportunity of describing in the following lines :—

Limnotragus spekei wilhelmi, subsp. n.

A small-headed *Sitatunga*, sexes dissimilar. The adult male is uniform greyish brown. The colour of the back is rather similar to "avellaneous" (Ridgway, 1912), the neck being a little paler. The lower parts gradually darker towards the centre of the belly, which is nearly similar to "Mars brown" (Ridgway), although not quite so reddish. A large patch of the upper throat is similar in colour. The centre of the forehead has a tinge of cinnamon, which, however, may be individual, as it is not present in the young males. The usual markings in front of the eye and on the cheeks as well as the chin white, and in addition to this also a white spot on the upper lip on the side of the muffle. The usual two white patches on the throat are also present, but the upper one, which is situated just below the dark patch mentioned above, is rather small. The long hairs along the median line of the upper neck have slightly paler tips, but behind the withers these tips become more plainly whitish, so that a faint dorsal median line may be discerned. The tail has the colour of the back or a little darker above, white below. The scrotal sac and surroundings covered with long white hair. Fore legs darker and richer brown even than the belly with a big white spot inside close to the body, white behind the knee, pale brownish, partly white behind the cannon-bone, and with a pair of well-developed white spots on the pasterns. Hind legs similar in colour, with a whitish stripe running from the inguinal region to the lower end of the cannon-bone and with two big whitish spots in front of the pasterns.

The female is tawny rufous, generally with a rather faint dark brown line mesially along the upper neck and back. The face is darker than the body, rufous on the forehead, dark brown on the snout; the sides of the head and the throat are paler and may be termed buff. The preocular spot is absent (or only represented by a few whitish hairs, which do not form any spot), but the two on the cheeks are present, although the lower one is rather indistinct. The upper lip is also provided with a white spot on the side of the muffle. Chin and the usual markings on the throat white. The legs much paler than in the male, especially the hind legs, but with corresponding markings.

The usual "harnessed pattern" is present, although rather

inconspicuous. Nevertheless, the lower horizontal stripe, as well as three or four of the anterior vertical stripes, may be traced as faintly indicated. A number of very small whitish spots on the hind-quarters are more easily seen. The upper-side of the tail is for two-thirds of its length of the same colour as the back, then more blackish in the outer third, but the extreme tip like the lower side white.

A young male with the two anterior permanent molars developed is essentially similar to the old buck in colour. The same is the case with a still younger male with only the foremost of the permanent molars developed. This latter specimen has as yet no trace of any horns.

A quite young male with only milk-dentition is somewhat darker than the older ones, a little more reddish than "warm sepia." In this one the "harness pattern" may be traced rather fully with the dorsal, the horizontal, and 6-7 vertical stripes, as well as some spots on the hind quarters, although in most cases the vertical stripes only consist of widely scattered whitish hairs.

Skull-measurements in mm. :—

	<i>L. s. wilhelmi.</i>		<i>L. s. spekei</i> (<i>vide</i> Thomas) *.	
	♂ ad.	♀ ad.	♂ ad.	♀ ad.
Greatest length	247·5	226·2	307	277
Condyllo-basal length	248·6	223·5	293	263
Greatest breadth	113	104	125	115
Length of nasals (greatest).	83·2	71·9	107	91
Palatilar length	131·4	123·4	162	154
Upper tooth-series	78·7	73·5	84	78

With regard to the colour the buck of this new race differs from *L. s. spekei* chiefly in the absence of any dark line from nape to withers, but presence of well-developed pastern-spots; from *L. s. selousi* by the female being rufous. The most important and striking characteristics by which the new race differs from all other *Sitatungas* are, however, to be derived from the skull. As may be plainly seen from the measurements quoted above, the skull of *L. s. wilhelmi* is much smaller than the corresponding ones of *L. s. spekei*, which latter is the smallest of all *Sitatungas* hitherto known. It will also appear as if the antemolar portion of the skull was shorter than the corresponding one of other species. In the adult buck of *L. s. wilhelmi* described above the distance between the first premolar and the end of the premaxillary is 64, and the same dimension of the female is 63·5 mm.,

* Mr. Oldfield Thomas has kindly communicated these measurements of typical *L. s. spekei* in the British Museum (Nat. Hist.).

but in a buck of *L. s. selousi*, for instance, it is 79.5 mm. The incisive foramina of the new race appear to differ essentially from those of other *Sitatungas* in shape and extension, being short and comparatively broad. In the buck their length is 18.5 and their breadth 6.8 mm., while the corresponding dimensions of a male of *L. s. selousi* are 30.6 and 7.4 mm.

The length of the horns of the adult buck is 422 mm. in a straight line, and they may be said to be almost of bushbuck-type, although of exaggerated size and with the usual white tips.

The length of head and body of the adult male measured in the flesh was, according to the taxidermist, 1390 mm.; tail 190 mm. without hairs; ear 135 mm. Perpendicular height at withers 970 mm. The corresponding measurements of the female are, respectively, 1190, 200, 120, and 780 mm. Upper length of front hoofs of the buck 88, and the same of the hind hoofs 81 (83) mm.; the same of the female, respectively, 80 (77) mm. and 79 (76) mm.

The specimens on which this description is based were collected in the Ruhuhuma Swamp, somewhat north of Lake Bunyoni, Kigezi district, British Ruanda, Jan. 31 and Feb. 1, 1921.

We take the pleasure of dedicating this interesting *Sitatunga* to H.R.H. Prince Wilhelm of Sweden, who shot the adult buck constituting the type now in the Royal Nat. Hist Museum at Stockholm.

EXPLANATION OF PLATE VII.

Skull of *Limnotragus spekei wilhelmi*, subsp. n.

XXV.—*The Male of Micropleura vivipara* [*Nematoda*].

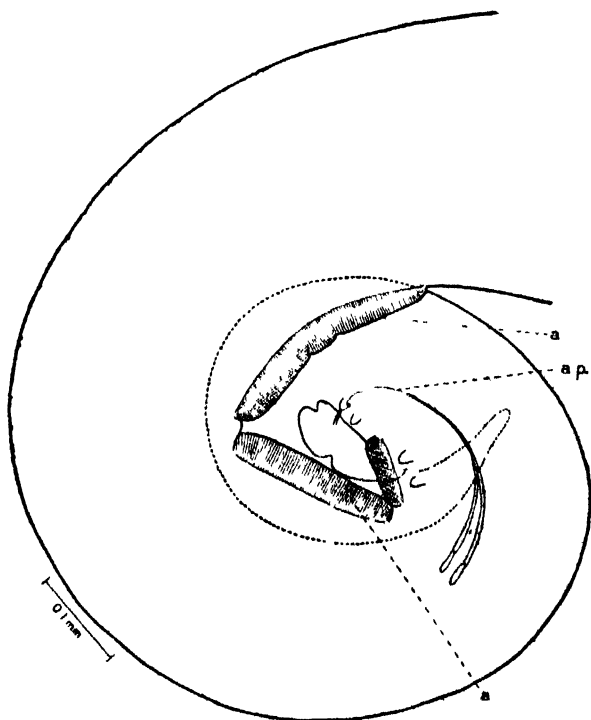
By H. A. BAYLIS, M.A., D.Sc.

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MICROPLEURA VIVIPARA, a parasite of the body-cavity and serous membranes of the gharial (*Gavialis gangeticus*), was originally described by von Linstow (1906). A new description of the female has been given by Baylis and Daubney (1922), but the only existing account of the male is the very brief one given by von Linstow. Further material of the species has recently been presented to the British Museum (Natural History) by Mr. B. K. Das, and includes three males. On examining these it was at once

evident that they did not agree with von Linstow's description, although there seems to be no reason to doubt that they really represent the male of *M. vivipara*.

Von Linstow's description of the male is as follows:—"The male is 85 mm. long and 0.72 mm. in diameter; $\frac{1}{590}$ of the total length of the animal is occupied by the caudal end; the latter bears ventrally on each side three small



Micropleura vivipara. Caudal end of male, viewed from the right side.

a., a., portions of the single ala of the right side; *a.p.*, accessory piece. The dotted portions of the tail are seen by transparency through the overlying col. of the body.

papillæ arranged in an arc, further one postanal papillæ [*sic*] placed on a roundish elevation, on each side, and behind these on one side of the short tail a small papilla; spicules 0.47 mm. long." It is further stated that the length of the oesophagus amounts to $\frac{1}{7.8}$ of the total length of the body in the male. A figure is given of the ventral view of the caudal

end of the male (pl. iii. fig. 1), which agrees with the text, but neither this figure nor the description at all resembles the specimens which are here regarded as the true males of *M. vivipara*. These (which are evidently mature) range from 9.9 to 10.6 mm. in length, and have a maximum thickness of 0.36–0.4 mm. The diameter of the head at the level of the papillæ is about 0.07 mm. The entire œsophagus measures 1.8–2 mm., or $\frac{1}{55}$ to $\frac{1}{53}$ of the total length, and its narrower anterior portion 0.44–0.5 mm. It shows the characters already described (Baylis and Daubney, 1922) for the female. The nerve-ring is situated at 0.38–0.4 mm., and the excretory pore at 0.6 mm., from the anterior end. The tail is conically tapering, not short and rounded as described by v. Linstow. It measures 0.5 mm. in length. There is a single caudal ala (*a* in fig.), on the right side, extending forward from in front of the cloacal aperture for some distance and somewhat interrupted. It shows well-marked transverse striations. There are seven pairs of subventral caudal papillæ, of which four are postanal and three preanal. The two most anterior papillæ on each side are close together, those on the right side being situated dorsally to the ala. The next two pairs of papillæ are also close together, one just in front of the cloacal aperture and one just behind it. The remaining papillæ are very prominent and conical. There is no pair of "roundish elevations" at the base of the tail, as described and figured by v. Linstow. The spicules are equal (0.3–0.33 mm.) in length, very slender and tapering to fine points. There is a well-chitinized accessory piece (*a.p.* in fig.), measuring 0.07 mm. in length.

It seems clear that the form here described and that taken by von Linstow for the male of *M. vivipara* are quite distinct, and it is suggested that von Linstow's male represents a different worm altogether from *M. vivipara*. The prominent postanal elevations bear a certain resemblance to the large rounded caudal papillæ of the female of *M. vivipara*, but it would perhaps be too much to suggest that there had been some confusion between the characters of the two sexes.

REFERENCES.

- BAYLIS, H. A., and DAUBNEY, R. 1922. "Report on the Parasitic Nematodes in the Collection of the Zoological Survey of India." Mem. Ind. Mus. vii. 4, pp. 263–347.
- LINSTOW, O. VON. 1906. "Parasites from the Gharial (*Gavialis gangeticus*, Geoffr.)." Journ. & Proc. Asiat. Soc. Bengal, li. 7, pp. 269–271, pl. iii.

XXVI.—*On new Species &c. of Octopoda from South Africa.*
By G. C. ROBSON, M.A.

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THE following preliminary diagnoses are based upon material collected by Dr. J. D. F. Gilchrist when conducting a marine biological survey for the Union Government of South Africa in 1921. A preliminary report of the Decapoda is already in the press in South Africa, and a more complete account of the taxonomy, anatomy, and distribution of the members of this interesting Cephalopod fauna is in course of preparation. The references to stations &c. are from Dr. Gilchrist's Reports (Nos. 1 & 2, Union of South Africa, Fisheries and Marine Biological Survey, 1921-2).

Eledonella massyæ, sp. n.

One specimen (♀) from Station 87 (S.W. Cape Town); 1014 fathoms.

I have provisionally referred this form to *Eledonella* after examination of the external parts, radula, central nervous system, and reproductive system.

The generic status of the various forms assigned to this and the kindred species will be discussed at length in the full report. The substitution by Sasaki (1920, p. 170) of *Chunella* (a new generic name) for *Bolitaena*, Chun, 1911, &c., and the validity of Joubin's arrangement (1918) of these forms according to the disposition of the central nervous system (an arrangement which breaks down in this case) will be fully dealt with at the same time.

Description of the Species.

Dimensions:—

	mm.
Mantle: length.....	51±2
" max. width	38
" aperture	23
Head: width (2 mm. above eyes) ..	20
1st arm-pair, length	27
2nd " "	31±1
3rd " "	
4th " "	25

The shape of the visceral sac is uniformly oval. The sac is gelatinous and, though wrinkled by preservation, was probably smooth. The ventral edge of the mantle-aperture

is slightly curved, and the aperture itself is wide and extends from just behind the eyes. The head is somewhat narrower than the mantle-aperture. The eyes are small. The funnel is rather broad and oblong. It reaches to about halfway between the eyes and the base of the arms. There is no funnel-valve, but the well-developed funnel-organ is highly characteristic and unlike that of any other species of the genus. The first pair of arms is united by a membrane for about half the arm-length. They are somewhat compressed laterally and carry nine widely-spaced suckers, of which the last three decrease in size. The distal 2-3 mm. are devoid of suckers. The second pair of arms, which is joined to the third by a slightly lower membrane, carries nine or ten similar suckers, and the extremities are likewise bare. The third pair is joined to the fourth by a still more exiguous membrane, and carries some ten suckers, of which the last three decrease in size very rapidly and are close together (cf. *pygmaea*, Verrill, 1884, pl. xxxii. fig. 2). The fourth pair is devoid of a membrane. These arms are mutilated, and only six suckers are visible.

The muscular septum in the mantle-cavity is well developed and extends to about 10 mm. from the mantle-aperture. The gill is very small, comprising only five lamellæ. There is a well-developed branchial gland, as in *Vitreledonella* (Joubin, 1918).

The circulatory and respiratory systems otherwise agree fairly well with the description of *Bolitaena diaphana*, Chun (1915, p. 499 &c.).

The peduncular ganglion is situated against the optic ganglion as in *Vitreledonella*. The radula is unlike that of *Vitreledonella*. Of the other two genera it resembles that of *Bolitaena* (cf. Thiele, in Chun, 1915, p. 493) more closely, though it differs in not having the base of the rhachidian tooth markedly wide in relation to the length of the central cusp.

The reproductive organs (♀) are remarkable for the large size of the proximal part of the oviducts. The system is unlike that of *Vitreledonella* in general. That of *B. diaphana* is unknown.

The following table gives the difference in external characters from the allied forms:—

(A) It differs from *E. diaphana*, Hoyle, in (1) possession of widely-spaced suckers, (2) its small eyes and narrow head, (3) its much reduced umbrella membrane, and (4) size.

(B) It differs from *Japetella prismatica*, Hoyle, in (1) the body-shape and length of mantle, (2) proportion of arms,

(3) size of head, (4) extent of umbrella membrane, (5) the widely spaced suckers.

(C) It differs from *E. pygmaea*, Verrill, in (1) size, (2) proportion of the arms, (3) the width of the head. A large part of the description of *pygmaea* is occupied with the hectocotylus, which is, of course, not available in this case, and the description is otherwise deficient.

(D) It differs from *B. microcotyla*, Hoyle, principally in (1) funnel-organ, (2) extent of umbrella membrane.

(E) It differs from *heathii*, Berry, in (1) funnel-organ, (2) proportion of arms and of various sections of umbrella membrane, (3) the widely spaced suckers, (4) extent of funnel and shape of visceral sac. Differences between this form and *Vitreledonella richardi*, Joubin, are noted above, while the two forms are very distinct in external characters.

E. alberti (Joubin, 1912) was only very superficially described, but it has clearly nothing to do with this species.

Cirrhoteuthis gilchristi, sp. n.

One specimen (♂) from Station 526 (U. 4723), S.W. Cape Town; in about 1400 fathoms.

Some sixteen or eighteen species have been referred at one time or another to this genus or to *Stauroteuthis*. After a preliminary study of the evidence, I am not prepared to accept the generic distinctions hitherto proposed, and, in consequence, am retaining Eschricht's generic name.

The present example has some affinity with *Chunioteuthis ebersbachii* (Grimpe, 1916), a Sargasso Sea form, but it is distinguished by the following characters:—

1. In *gilchristi* the visceral mass is very much reduced and the fins are terminal, as in *C. grimaldii*, Joubin, from which it is otherwise distinct, notably in the shape of the cartilage.

2. In *gilchristi* the fins are relatively smaller and more rounded.

3. The character of the suckers (see below).

4. In *gilchristi* the cirrhi of the arms are smaller than in *ebersbachii* (maximum 18 mm. instead of 25 mm.).

Definition.

The visceral sac is very much reduced. A line drawn along the ventral border of the fins passes across the sac halfway between the funnel and the apex of the sac. The fins are apical in position and rounded at the tips.

Dimensions :—

	mm.
Total length	165
Width across fins	53
Transverse width (between the eyes)	34 (approx.).
Arms: length, 1st pair	130 (L.).
" " 2nd "	135 (R.).
" " 3rd "	130 (R.).
" " 4th "	120 (R.).

The suckers of the longest arms are about sixty-three in number. They are set fairly widely apart, save at the distal extremities, where they are crowded together. The first suckers (adoral) are fairly large; the next four are small, after which there is an abrupt increase in size. The largest are between the sixth and tenth, after which there is a gradual diminution in size. The first suckers are squarish in profile, the larger ones more pyramidal. The square outline is again seen towards the extremity of the arm. The cirrhi are very minute between the first four or five suckers, after which they increase in size. They do not extend beyond the level of the twenty-third or twenty-fourth sucker.

The following differences between this form and *C. ebersbachii* with regard to the suckers are to be noted:—

(1) The large suckers (6–10) are more definitely localized in *gilchristi*.

(2) The adoral suckers in *gilchristi* are not so closely set as in *ebersbachii*.

(3) In *ebersbachii* the cirrhi are absent between the first four suckers.

(4) Grinpe (*l. c.*) does not refer to the large size of the adoral sucker.

As Grinpe's specimen was a mature male, there is no chance that some of these differences are sexual.

The *internal cartilage* is bent in a wide obtuse angle. Its sides are more or less parallel in section; the extremities are pointed. It is more slender and flatter than that of *ebersbachii*, and resembles that of *umbellata* somewhat, though it is not nearly so horse-shoe-shaped. The *genitalia* resemble those of *C. ebersbachii* (cf. *Stauroteuthis* sp., Ebersbach, 1915, fig. 18), but they differ in (1) the possession of an accessory gland between the second and third vesicula seminalis, and (2) in the disposition of the accessory penial glands. This form differs more markedly in respect of this system from *C. umbellata* (Ebersbach, *l. c.*).

Velodona togata, Chun, var. *a*.

Four specimens: two (♂) from Natal Coast, Station 99 (U. 801), 220 fathoms; one (♂) from Natal Coast, Station 396 (U. 3693), 250 fathoms; one (♀) from Natal Coast, Station 162 (U. 1527), 240 fathoms.

These specimens agree in exhibiting certain constant differences from the original description (Chun, 1915, p. 479), which was based on a single adult male obtained off the East African coast (Station 249) in 749 metres.

Chun's specimen was much larger than these examples, so that I do not feel justified in regarding the differences enumerated below as of definite varietal rank. The marked difference in the hectocotylus described below may, after all, be only a matter of age, if we regard a difference of 46 mm. (Chun, 109 mm. dorsal mantle-length; Natal specimens, maximum 63 mm.) as a safe index of age-difference.

The shape of the visceral sac in Chun's specimen was round and distinctly broader than long (ventral length 80 mm., width 99 mm.). In the Natal examples it is as follows:—

	Length. mm.	Width. mm.
Station 162 (♀).....	35	35
" 396 (♂).....	43	43
" 99 (♂♂).....	48	49
	29	34

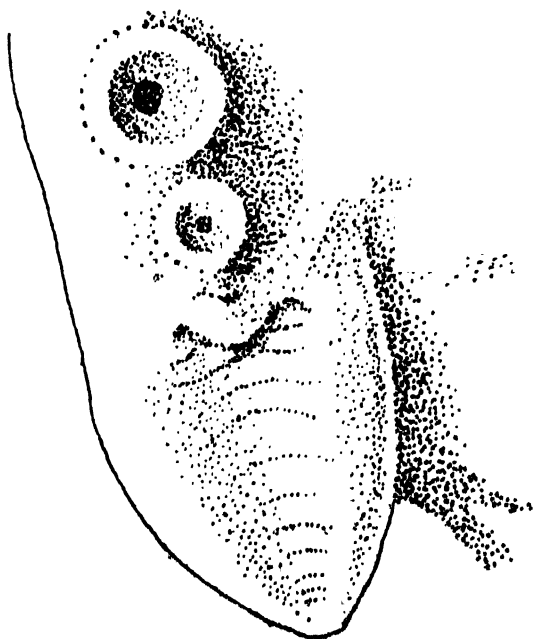
Although the number of specimens is very slight, there is a fair assumption, since the smallest (29 mm.) is relatively broader than the largest (48 mm.), that the great width of Chun's specimen is not necessarily due to age.

The anterior surface of the mantle and the arms is covered, as in Chun's specimen, with large and small warts, which are, again, covered with spines. These latter number up to sixteen (thirteen in Chun's specimen).

In Chun's figure (*l. c.* pl. lxxvi.) there is figured at the base of the dorsal arms two large warts with apparently an orifice in their apices. In the Natal specimens these are likewise found, but in addition there is a limited number scattered over the mantle in addition to the other warts. The umbrella and its relation to the arms in general agree with Chun's description. The latter is not very complete, and leaves a certain amount of uncertainty as to the relative size of the basal part of the umbrella between the various arm-pairs. However, Chun says that between the first pair it is a third the length of the arms. In the present case it is between a

quarter and a fifth of the length of the first pair, and approximately the same is true of the fourth pair, while between the second and third pairs it is larger. The continuation of the dorsal membrane on to the outer side of the arms to form a groove with the ventral membrane is scarcely perceptible in this case.

The hectocotylus (see text-figure) is markedly different from that of Chun's specimen. The reproductive system is fully developed in the two larger males and the testis was



Velodona togata, Chun, var. *a*. Hectocotylus, $\times 6$.

large; but, for all that, the hectocotylus does not look fully developed as compared with that of other forms. On the other hand, the differences we might ascribe to age are quantitative rather than qualitative—differences of size and definiteness of the furrows and outline of the parts. I consider it very unlikely that with the reproductive system fully developed the hectocotylus would change its character to the extent necessary to approximate it to that of Chun's specimen, even if the animal had still some 32 mm. to grow. In the absence

of exact information as to the growth of the hectocotylus, this must remain purely *à priori* reasoning.

The colour of the three males is a rather deep reddish brown (verging in a distinctly purple shade in one). This colour is found only on the anterior surface of the mantle, head, and arms. The ventral surface is very much paler, though it shows a scattering of fine dull reddish chromatophores. The female specimen is darker brown in colour. In both sexes the anterior surface of the mantle is marked off from the posterior by a more or less distinct ridge, as in *Scorargus*. This is not noticed or figured by Chun. The colour of Chun's specimen was light reddish brown.

While some of the differences enumerated here may be due to age, I am inclined to think that probably those relating to (a) the umbrella, (b) the papillation of the mantle, and (c) the width-length ratio of the visceral sac are significant.

Bathypolypus grimpei, sp. n.

One specimen (♂) from Station 405 (Natal Coast), 470 fathoms; seven specimens (1 half-grown ♂, 2 juvenile ♂, 4 ♀) from Station 164 (Natal), 380 fathoms.

Grimpe (1921, p. 300) placed *arcticus*, Prosch, *lentus*, Verrill, *obesus*, Verrill, and (?) *faroensis*, Russel, in the genus *Bathypolypus*, which he has not, however, yet defined. He designated *arcticus* as the type-species. Assuming that he has in view the large massive hectocotylus of these forms as one of his principal generic features, I have no hesitation in ascribing this form to the group in question. Isolated features (e.g., the skin, cirrhi, and spermatophores) resemble members of Grimpe's genus so closely that its affinities are clearly with them. Of all the Octopodinæ, it most closely resembles *B. lentus*. From this form, however, it is distinguished by (1) the arm-formula, (2) hectocotylus, (3) the ratio of the mantle-length to the total length, (4) the arrangement of the basal suckers, and (5) the absence in this form of the characteristic pallial membrane seen in *lentus*.

Definition.

Dimensions :—

	mm.
Length: oral membrane to apex of mantle . . .	57
Width: mantle	41
" between eyes	38.5
Depth of web (minimum):	
between dorsal arms	32
" 1st and 2nd	34
" 2nd and 3rd	36
" 3rd and 4th	33
" ventral arms	28

	L. mm.	R. mm.
Length of arms: 1st pair	102	101
2nd pair	104	103
3rd pair	104	105
4th pair	105	104

The general appearance is very characteristic. The arms are relatively short and the visceral sac broadly conical and flattened antero-posteriorly. The colour is dark purplish brown on the anterior surface, lighter posteriorly. Some light blotches appear on the anterior surface and some dark ones on the posterior. The darker colour on the anterior surface in the head-region is due to the pigmentation of the warts described below, while towards the apex of the mantle they become lighter.

The dorsal surface of the arms, the web, and the mantle-sac are closely covered with low irregular warts, which in the apical region of the visceral sac are larger and appear pale against the darker basal pigment. These warts are especially well developed round the eyes, above which are found two short and ill-developed cirrhi.

There are about fifty-six pairs of suckers on each arm; the first two and the last two or three are unpaired.

The *hectocotylus* is broad and massive. The ligula is 13 mm. wide, or more than twice as wide as the arm itself. Its edges are folded upwards to form a deep cup-shaped organ, which is approximately 11 mm. in depth, or nearly as deep as the organ is wide. It exhibits four strongly-marked ridges and terminates in a short acute point. The calamus is well developed and broadly triangular. The sperm-canal is remarkably short, measuring not more than 22 mm. from the calamus to the edge of the velum.

The *mantle aperture* is very narrow, measuring 26 mm. in a specimen 41 mm. wide. The funnel-organ is remarkably undeveloped. In the type it is practically absent. In one or two of the smaller specimens it is found poorly developed as a pair of V-shaped widely separated patches. The limbs of the V are of irregular width.

The male reproductive system agrees very closely with that figured for *B. arcticus* by Prosch (1849, pl. i. figs. 1 & 3), but the first part of the vas deferens is longer and the accessory organ is of a different shape, viz., club-like. The penis is somewhat different with regard to the diverticulum. The *spermatophores* agree with those of *arcticus* (Prosch, l. c. fig. 2) in the swollen aboral extremity, but are otherwise different

as far as one can infer from the somewhat unsatisfactory figure of Prosch.

REFERENCES.

- CHUN, C. 1915. *Ergebn. Deutsche Tiefsee Exp.* xviii. Bd., Cephalopoda, ii.
 EBERSBACH, A. 1915. *Zeitsch. wiss. Zool.* Bd. cxiii. 3, p. 301.
 GRIMPE, G. 1916. *Zool. Anzeig.* Bd. xlv. 12, p. 355.
 —. 1921. *Zool. Anzeig.* Bd. lli. 12-13, p. 300.
 JOUBIN, L. 1918. *Bull. Inst. Oc. Monaco*, no. 310, p. 40.
 PROSCH, V. 1849. *K. Danks. Vid. Selsk. Skr.* (5) i. p. 55.
 SAKAKI, M. 1920. *Proc. U.S. Nat. Mus.* lvii. no. 2310, p. 170.
 VERRILL, A. 1884. *Trans. Connect. Ac.* vi. p. 139.

XXVII. — *On some Oligochaete Worms from Spitsbergen. Results of the Merton College Expedition to Spitsbergen, 1923.*—No. 3. By J. STEPHENSON, M.B., D.Sc., Lecturer in Zoology, Edinburgh University.

SOME little time ago I received from Mr. C. S. Elton, of New College, Oxford, twelve tubes of small worms collected by him in Spitsbergen during July and August 1923. These are described in the present paper, which may thus be regarded as a pendant to my former account of the Oligochaeta obtained by the Oxford University Spitsbergen Expedition of 1921 (*Proc. Zool. Soc. Lond.* 1922).

The worms all belong to the family Enchytraëidæ. The same species is sometimes contained in more than one tube; some of the specimens are not sexually mature, and others are apparently over-mature and degenerating; while some are not in good condition or are otherwise unsuitable for description. The number of species identified is thus not large.

Enchytraeus albidus, *Lumbricillus ægialites*, and *Henlea* (*Henlea*) *brucei* were found in the previous collection; *Enchytraeus eltoni*, *E. liefdeensis*, and *E. muscicola* are new, and are to be added to the list of Spitsbergen Oligochaetes given in my previous paper.

Genus HENLEA, Mich.

Henlea (*Henlea*) *brucei*, Steph.

Liefde Bay (northern coast of West Spitsbergen); in plants on dry tundra; 28. vii. 1923. (A. 9.)

Henlea (Henleanella) sp.

Liefde Bay (northern coast of West Spitsbergen); in plants on dry tundra; 28. vii. 1923. (A. 11.)

In bad condition; and the matter in the alimentary canal unfortunately ruined the sections.

Henlea (Hepatogaster) sp.

Liefde Bay (northern coast of West Spitsbergen); in plants on dry tundra; 28. vii. 1923. (A. 11.)

With the foregoing, and unfortunately in a similar condition.

Genus *LUMBRICILLUS*, Örst.

Lumbricillus ægialites, Steph.

Liefde Bay (north coast of West Spitsbergen); intertidal, under stones; 22. viii. 1923. (A. 204, A. 205.)

Same locality; intertidal, under dead seaweed, higher up on shore than the last two; 22. viii. 1923. (A. 206.)

Same locality; under stones by shore of fresh-water lagoon recently cut off from the sea; 23. viii. 1923. (A. 234.)

Eastern South Waigat Island; under rotting seaweed at high-tide mark (the island is constantly surrounded by drift ice which packs against the shore); 5. viii. 1923. (A. 55.)

Some of the examples showed slight differences from the previous specimens, found by the 1921 Expedition at the head of Klaas Billen Bay in seaweed at high-tide mark. These were, on the whole, shorter; the setæ were in general two per bundle, both ventral and lateral, throughout the postclitellar segments; there were no cœlomic corpuscles; the vas deferens was apparently a rather short coil (not a long one, as in the former examples); and the connection between the spermathecal ampulla and the œsophagus was not patent. The last two characters might perhaps be due to the present specimens not being as fully mature as those previously described.

Genus *ENCHYTRÆUS*, Henle em. Mich.

Enchytræus albidus, Henle.

Green Harbour (in Icefjord); in fine shingle under driftwood at high-tide mark on the shore; 26. vii. 1923. (A. 4.)

Enchytræus eltoni, sp. n.

Liefde Bay (north coast of West Spitsbergen); under stones by shore of fresh-water lagoon recently cut off from the sea; 23. viii. 1923. (A. 234.)

Length 5-6 mm.; diameter 0.37 mm. Segments 29-32. Colour pale, yellowish.

Prostomium very short and blunt, rounded. Head-pore present, between prostomium and first segment. No dorsal pores.

Setæ enchytræine in form, straight and bluntly pointed; in front of the clitellum, in both ventral and lateral bundles, there are often three, sometimes only two, setæ; behind the clitellum there are two setæ per bundle.

There are numerous mucous cells in the epidermis which stain deeply with hæmatoxylin.

Septal glands are present, of moderate size, in segments iv., v., and vi. There are no salivary glands; post-pharyngeal bulbs are present.

The coelomic corpuscles in many places run together into amorphous deeply-staining granular masses, in which nuclei are visible; the length of individual corpuscles is 21–36 μ .

The dorsal vessel begins in segment xi., or in one of the two specimens perhaps in x.; the blood stains with eosin, and hence contained hæmoglobin in life.

The nephridia are relatively small; the preseptal portion is small, and the organ is somewhat constricted at the septum; the postseptal portion has no very characteristic shape—it may perhaps be described as somewhat pear-shaped, with the broader end in front; it is continued behind into the duct, and there is no sharp delimitation between the duct and the body of the organ. The duct is half as long as the postseptal portion, and is directed downwards or downwards and backwards.

The clitellum is not distinguishable, even in sections. The position of the male pores is indicated by small papillæ.

The testis consists of a few fairly large lobes, each lobe limited by a membrane, and containing sexual products in all stages of development; in Welch's phrase, the testes are lobed but not divided. The membrane enclosing the organ must have given way at one or more places, since spermatozoa are aggregated round the mouths of the funnels.

The male funnels are small, about as long as broad or somewhat longer; they have a lip of closely-set cells, and for the rest their form is rounded, somewhat like that of a "thistle-funnel." The vas deferens is thin, 4–5 μ in diameter, tightly coiled, and transparent-looking.

A small penial bulb is present, constituted by a mass of cells, each typically pear-shaped, with its narrow end at the body-wall; the mass forms a tuft which projects into the body-cavity and is traversed dorso-ventrally by the terminal portion of the vas deferens, which does not lose its identity within the bulb. The height of the tuft of cells is 115–125 μ ,

or including the thickness of the body-wall 140μ ; it has no muscular investment, but is covered by a thin layer of peritoneum. The bulb thus lacks the definite ovoid outline and the muscular capsule of the lumbricilline penial body, but is more compact than the corresponding structures in many species of the genus *Enchytræus* (e.g., *E. albidus*).

The ovaries are in segment xii.; each consists of several pear-shaped lobes. Large ova, with eosin-staining yolk, are also present in segment xiii.

The spermathecal ampulla is circular in section, with a diameter of 62μ ; it is attached to the dorsal side of the œsophagus, but there seems to be no patent communication, at least at the stage represented by the present specimens; the epithelium of the ampulla is approximately cubical. The duct is cylindrical, not covered by glandular cells, which are present only round the ectal end; the main part of the duct has an investment of clear non-glandular peritoneal cells; the diameter of the duct, including the peritoneal covering, is 57μ , without the peritoneum 33μ .

There are no copulatory glands.

It will be seen that the present species, like some others, combines certain characters of the genus *Lumbricillus* with others of the genus *Enchytræus*. Thus the setæ, the imperfect penial bulb, and the absence of copulatory glands are enchytræine characters; while the red blood and the lobed testis are marks of the genus *Lumbricillus*.

Enchytræus liefdeensis, sp. n.

Liefde Bay (north coast of West Spitsbergen); under wood at high-tide mark; 22. viii. 1923. (A. 207).

Length 10–11 mm.; diameter 0.44 mm. Colour pale, yellowish.

Prostomium short, rounded, broader at the base than it is long. No head-pore seen; no dorsal pores. No mucous cells in the integument.

Setæ enchytræine, straight, moderately sharply pointed; the preclitellar bundles contain usually three, occasionally two, setæ, the postclitellar regularly two.

Septal glands are present in segments iv., v., and vi. There is a pair of very large salivary glands; these originate from a depression in the œsophageal wall immediately behind the pharynx: they are narrow near their origin, and become wider, forming conspicuous cylindrical tubes, further back; their course is at first upwards and backwards, then downwards to the ventral body-wall in segment iv.; their diameter

varies, being $30\ \mu$, $40\ \mu$, and $57\ \mu$ at various parts; the lining cells are of rather irregular height.

The œsophagus is narrow as far as segment vi., and is bulged segmentally in vii., viii., and ix. There are numerous parasitic Ciliata in this portion of the tube.

The cœlomic corpuscles are oval or spindle-shaped, nucleated, and granular; in length they are $20\text{--}30\ \mu$.

The dorsal vessel begins in segment xii.; the blood stains with eosin, and therefore contains hæmoglobin in life.

The nephridia have a small and narrow anteseptal portion, and an elongated and ovoid postseptal. The short duct is the hinder end of the organ bent towards the surface at a right angle; the whole organ is pressed down so as to lie directly on the body-wall.

The clitellum extends over segments xii. and xiii., and includes a little of xiv. also. The male pores may either be on slight elevations or in slight depressions.

The proper testes seem to have disappeared; there are male sexual cells and spermatozoa free in segment x.

The funnels are perhaps from two to three times as long as broad; but this is only a rough estimate, since they do not lie in the plane of the sections. The vas deferens, $16\ \mu$ in diameter, forms a large and conspicuous coil in segment xii. There is no penial body; but a number of small club-shaped cell-aggregates are present round the termination of the vas deferens, their swollen ends internal and their smaller ends at the surface.

Ovaries and very large free ova are present in segment xii.

The spermathecal ampulla is elongated, somewhat cylindrical in shape but broader below; in length it is $156\ \mu$, or perhaps a little more, since the whole length is possibly not included in any single section; the diameter about its middle is $66\ \mu$; its epithelium is approximately cubical. The ampulla is fused with the wall of the œsophagus, but no patent communication between the two could be followed out. The duct is nearly as long as the ampulla, $125\ \mu$, rather irregular in outline and slightly twisted; it is rather more than half as thick as the ampulla; it has no investment of gland-cells, but is covered with peritoneum.

There are no copulatory glands.

Enchytræus muscicola, sp. n.

Liefde Bay (north coast of West Spitzbergen); in salt-marsh moss; 23. viii. 1923. (A. 248.)

Length 3 mm.; diameter 0.3 mm. Segments 26. Colour pale, yellowish.

Prostomium short, very blunt. No head-pore seen; no dorsal pores.

The ventral bundles in front of the clitellum contain three setae, the lateral two or occasionally three; behind the clitellum all contain two setae. The setae are euchytræine in form and are bluntly pointed.

Deeply staining mucous cells are scattered through the epidermis.

There are no salivary glands. Postpharyngeal bulbs are present as small ovoid aggregates of cells, with, however, only indefinite stalks—in other words, their connection with the wall of the alimentary tube seems slight.

The septal glands are rather small, in segments iv., v., and vi.

The dilatation of the œsophagus is gradual; it bulges out segmentally in vii. and succeeding segments.

In some of the anterior segments there is a reticular coagulum, containing nuclei, perhaps formed by the coalescence and disintegration of cœlomic corpuscles.

The dorsal vessel appears to begin in x.; this is very far forward for a worm of this genus, but I have not been able to distinguish the vessel behind this; only one specimen, however, was in really suitable condition for investigation. The blood stains with eosin.

The nephridia are rather small, and the shape is irregular; a fairly large part of the organ is in front of the septum, and the canal appears to undergo some windings in this anteseptal portion. There may be no constriction at the septum. The duct is the hinder end of the organ bent downwards.

The clitellum is not marked; it appears to extend over two-thirds of segment xii. and the whole of xiii.

The testis is massive, lobed but not divided, in segment xi. Sexual cells are seen in all stages up to that of the mature spermatozoa; in places there is a thin membrane round the aggregate, but it is not complete, and a number of spermatozoa have escaped and are aggregated round the mouth of the funnel.

The funnels are short, about one and a half times, or not more than twice, as long as broad. The vas deferens is long, tightly coiled, and thin— 6μ or in places up to 8μ in diameter.

There is a compact penial body of the lumbricilline type, ovoid in form with the long axis dorsoventral, and surrounded by a capsule in which muscular fibres are distinguishable; its dimensions are 100μ by 70μ .

The ovary is also lobed like the testis.

The spermathecal ampulla forms a swelling of the end of the tubular duct and is 40μ wide; it joins the œsophageal wall, but no patent passage between the cavities of the two could be distinguished. The duct is tubular, 28μ thick, with a narrow lumen; the wall is formed of a regular cubical epithelium; the ectal portion is surrounded by small cells, which are distinct from the cells of the duct-wall, and have not the appearance of gland-cells, they do not appear to lead through the duct-wall to discharge into the lumen of the tube and may be only modified peritoneal cells.

There are no copulatory glands.

Of four specimens that appeared possibly to be of this species, three were found, after sectioning, to be undergoing some internal degeneration; in addition, they were characterised by having a number of intensely granular cœlomic corpuscles, very opaque and appearing black to transmitted light (like those of *E. argenteus*). This granular matter of the corpuscles may be connected with the degenerative process—the corpuscles may be taking up the products of abnormal metabolism. But in any case these three specimens were not suitable for description, and the above account has been written from a single specimen only.

I think it very possible that the present species may be the same as the worm I shortly described in my former paper (*Enchytraeus* sp., p. 1135), but without naming. The chief differences are that the present specimen shows three setæ in the antecloital ventral and some of the lateral bundles, as against two in the former examples; and that the dorsal vessel originates in segment x. here, in xii. in the former. But I do not think that these small differences preclude the union of the previous examples with that now described.

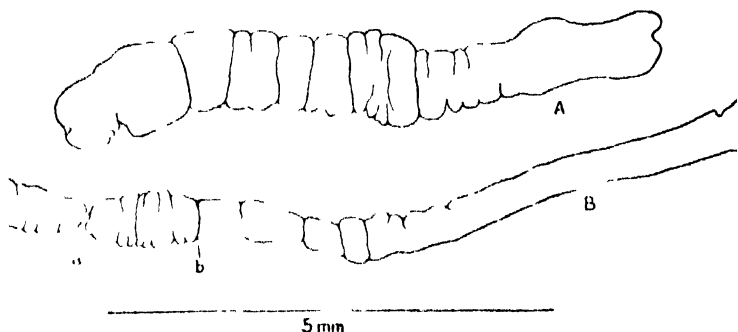
XXVIII.—On the Occurrence of *Ligula ranarum* in a Frog.

By F. J. MEGGITT, M.Sc., Ph.D., Professor of Biology,
University of Rangoon.

DURING the dissection of a frog (*Rana tigrina*) Mr. G. D. Bhulerao, M.Sc., of this University, found embedded in the wall of the stomach three cestodes.

The specimens were 70–85 mm. long and 1.1 mm. broad. At the anterior end was a small terminal bothridium, sucker-like in appearance, in sections not delimited from

the surrounding parenchyma by a membrane, but merging imperceptibly into it. External segmentation varied in the three examples. In the youngest it was confined to the anterior part of the body, only three proglottides being formed; in the oldest (text-fig., A) it extended nearly to the posterior end, and was well defined. The third specimen (B) was peculiar. At two points (*a*, *b*) transverse fission could be observed, in one case with the two portions practically separated from one another, in the other with a small neck of tissue connecting the two halves. After each division external segmentation was well defined, gradually disappearing posteriorly. In *Sparganum prolifer* (Ijima, 1905) proliferation and subsequent detachment of the portions is of normal occurrence, a further stage in the development of the process just described. The general appearance bore a great



A. Older specimen. B. Younger specimen. *a*, *b*. Points of fission.

resemblance to the fragmentation of *Haplobothrium globuliforme* as described by Cooper (1918, p. 47). This, together with the case of *Trilocularia gracile* (Olsson, 1869) (= *Urogonoporus armatus*, Lühe, 1901), suggests that such asexual reproduction may be more common in the larvæ and adults of the Pseudophyllidea than is usually supposed.

The musculature varied according to the position in the body, but, on the whole, was weak. Anteriorly were only cuticular transverse and longitudinal muscles; later a definite longitudinal muscle-layer of numerous bundles, each consisting of several fibres, originated, but posteriorly became obscured by the infiltration of the genital anlagen. Well-developed dorso-ventral strands stretched from surface to surface. No transverse muscles could be seen. Calcareous corpuscles were few. The excretory system consisted of four

main longitudinal vessels in the same transverse straight line across the proglottis, linked with each other by a complex capillary anastomosis. Their courses were sinuous and their diameters varied greatly. Only the rudiments of the genital organs were present, scattered confusedly amongst the muscles. They were not sufficiently developed for the identification of the various parts. No nutritive bodies, similar to those observed by Ijima (1905, p. 15) in *Sparganum prolifer*, could be found.

The previous records of larval Pseudophyllidea from Amphibia are as follows:—

<i>Amblystoma</i>	<i>Ligula intestinalis</i> (L., 1758).
<i>Amblystoma</i> sp.	"
<i>Cryptobranchus maximus</i> ..	<i>Bothriocephalus</i> sp., Leuckart.
<i>Rana esculenta</i>	<i>Bothriocephalus</i> sp., Gastaldi.
	<i>Ligula ranarum</i> , Gastaldi, 1854.
	<i>Schistocephalus solidus</i> (Müller, 1776).
<i>Rana nigromaculata</i>	<i>Diphyllbothrium mansonii</i> (Cobbold, 1883).
<i>Triton dorsalis</i>	<i>Sparganum reptans</i> (Diesing, 1850).

Of these, *Sparganum reptans* has no bothridia nor invagination, *Bothriocephalus* sp., Leuckart, presumably two bothridia, and *Schistocephalus solidus* well-developed muscular layers; they may all, therefore, be dismissed. The contrast between examples of *Schistocephalus* and the present form is very striking.

There remains *D. mansonii*. Recent work by Okmura (1919) and Yoshida (1922) has shown that the immature form (*Sparganum* or *Ligula mansonii*) from the frog, if fed to carnivores, develops into an adult species of *Diphyllbothrium*. From the European *Rana esculenta*, *Sparganum* larvæ have been described, but in spite of careful work upon the Diphyllbothriinae by various investigators no corresponding adult has been observed, though, as Kotlán (1923, p. 277) has shown with *D. raillieti* (Rátz, 1912), it is possible for such a form to be overlooked. Again, *Sparganum* larvæ have been recorded from the American *Amblystoma*, but no adult discovered. In the present case the frogs were collected from flooded paddy-fields, where carnivores would hardly be numerous. During the dry season dogs may occasionally be found in the fields, but even then keep mostly to the vicinity of houses, and frogs are absent; in the rains dogs are rarely to be observed outside the villages. On the other hand, from European birds there have been recorded several species whose life-histories are still unknown. Frog-eating birds are plentiful in the district where the specimens were collected. For these reasons, although the morphological

difference—the presence of external segmentation—is slight, it seems more advisable to consider the present form a species of *Ligula*.

Altogether fifty-five species of this genus have been described, and have either been included in the single species *L. intestinalis* or removed to another genus. The form from the frog differs from the normal *L. intestinalis* in having (a) external segmentation extending to the posterior end, (b) weak musculature, and (c) two zones of fission. These differences appear sufficient to justify its establishment as a distinct species. Gastaldi's description (1854), unfortunately, is inaccessible to me; failing suitable distinctions, it is more advisable to consider the present form *L. ranarum* (Gastaldi, 1854), and to separate it definitely from *L. intestinalis*, than to propose a new name which, later, would only become a synonym. A search is being made among the bird-fauna of paddy-fields for the adult form, which, if discovered, should settle definitely the specific identity of *L. ranarum*.

LITERATURE.

- COOPER, A. R. (1918.) "North American Pseudophyllidean Cestodes from North American Fishes." Illin. Biol. Monogr. iv.
 GASTALDI, B. (1854.) 'Cenni sopra alcuni nuovi elminti della *Rana esculenta*, con nuove osservazioni sul *Codonocephalus mutabilis*, Diesing.' Torino.
 IJIMA, I. (1905.) "On a new Cestode Larva parasitic in Man." Journ. Coll. Sci. Imp. Univ. Tokyo, xx.
 KIESSLING, F. (1882.) "Ueber den Bau von *Schistocephalus dimorphus*, Creplin, und *Ligula simplicissima*, Rudolphi." Arch. f. Naturges. xlviii. pp. 241-280.
 KOTLÁN, A. (1923.) "Ueber *Sparganum railletii*, Rätz, und den zugehörigen geschlechtsreifen Bandwurm *Dibothriocephalus railletii*, Rätz." Centrbl. Bakt. Abt. 1, Orig., xc. pp. 272-285.
 LÜTKE, M. (1921.) "Cestodes," in Die Süsswasserfauna Deutschlands, II. 18.
 YOSHIDA, S. (1922.) "On the Morphology of the Adult Worm of *Sparganum mansoni* found in the Frog and other Animals." Tokyo Med. News. (Abstract Trop. Dis. Bul. xx. p. 223.)

XXIX.—On the *Nephrocytes* in the Larvæ and Pupæ of *Lonchæa chorea*, F. (*Diptera Acalyptera*). By D. KEILIN, Sc.D., Beit Memorial Research Fellow.

(From the Institute for Research in Parasitology, University of Cambridge.)

THE nephrocytes, or excretory ductless cells, are known to exist in almost all the Arthropods. While in some cases their structure and distribution can be easily seen in dissected

Fig. 1.

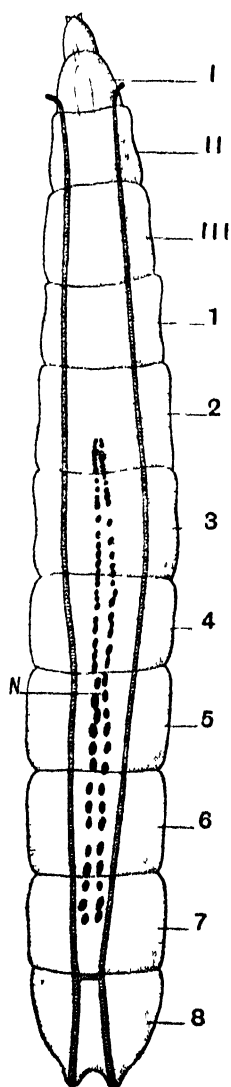


Fig. 2.

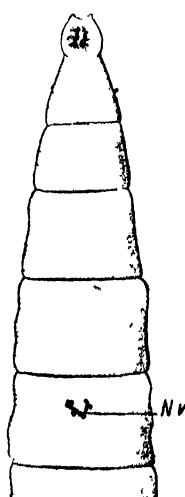
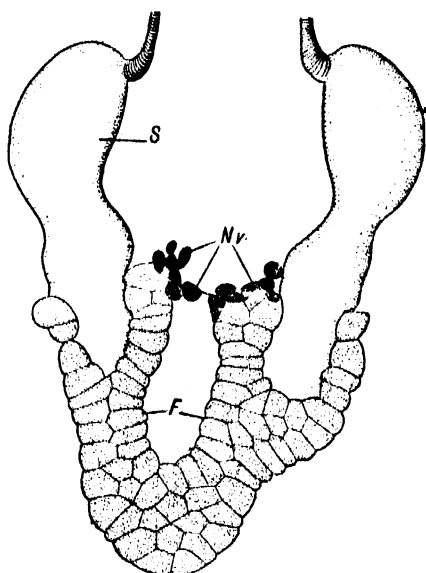


Fig. 1.—*Lonchaea chorea*. Larva *in vivo*, seen dorsally, $\times 15$. N., pericardial nephrocytes; I-III, three thoracic, and 1-8, eight abdominal segments.

Fig. 2.—*Lonchaea chorea*. Larva *in vivo*, seen ventrally, $\times 15$. N.v., ventral nephrocyte.

Fig. 3.



Lonchæa chorea. Portion of a dissected larva.
F., fat-body; N.v., ventral nephrocytes; S., salivary glands.

Fig. 4.

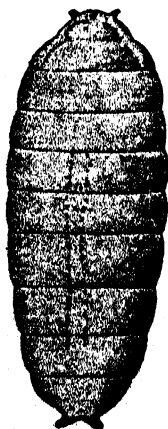


Fig. 5.

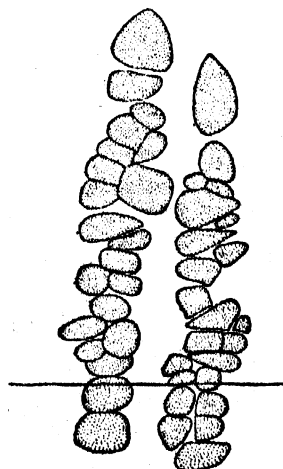


Fig. 4.—*Lonchæa chorea.* Pupa *in vivo*, seen dorsally, showing pericardial nephrocytes. $\times 11$.

Fig. 5.—*Lonchæa chorea.* Anterior groups of pericardial nephrocytes lying in the second abdominal segment of the larva. $\times 170$.

specimens, or even by transparency, in other cases these cells are so embedded in other tissues (*e. g.*, fat-body) that they can only be detected by suitable staining. This is effected by injecting into the body-cavity of the living animal various coloured substances, which are taken up and stored by the nephrocytes*.

Some years ago, while working on nephrocytes in various dipterous larvæ, the writer found in a decomposed mangol-wurzel a few larvæ of a fly, *Lonchæa chorea*, F., which showed naturally stained nephrocytes. Since this observation the larvæ of *Lonchæa* have been seen on several occasions, living in a similar situation and always showing their nephrocytes coloured in the same way.

The opportunity has now been taken to represent these nephrocytes as they were seen in the living larva and pupa, and to show at the same time an interesting case demonstrating the natural function and distribution of these cells. The nephrocytes were coloured in all shades from light brown to almost black, the coloration being due to accumulation within the protoplasm of the cells of a great number of small granules. In a few cases the nephrocytes were overloaded with these granules to such an extent that they had become angular and were beginning to break up into pieces. The brown granules so liberated were taken up by leucocytes, which then became very numerous. These leucocytes, scattered throughout the body-cavity and heavily charged with the dark granules, gave to the larvæ a general greyish appearance.

The best specimens demonstrating the distribution of the nephrocytes are those which have these cells stained almost black. Fig. 1 represents a living larva of this type, slightly pressed between a slide and cover-slip, and examined dorsally. The two pericardial chains of the nephrocytes (*N.*), as shown in this figure, extend between the middle of the seventh and the posterior third of the second abdominal segments. In the posterior segments (seventh, sixth, and fifth) the nephrocytes are of large size; they become smaller in the fourth and third segments, still forming two regular chains of cells; but on reaching the second abdominal segment they become of a very irregular size and shape, forming in places clusters of two or three up to seven cells (fig. 5). The total number of pericardial nephrocytes is fairly constant,

* For the complete historical account, see Keilin (1917), "Recherches sur les Anthomyides à larves carnivores," *Parasitology*, ix. pp. 325-450.

namely, from fifty-two to fifty-seven on either side of the dorsal vessel. The same larva, examined ventrally (fig. 2), clearly shows in the second abdominal segment a group of fourteen small cells disposed in a semicircle open anteriorly (*N.v.*). The true position of these cells in relation to other organs of the larva can be seen only in a dissection such as is represented by fig. 3. This shows the posterior portions of both the salivary glands (*s.*) embedded in a small lobe of the fat-body composed of about eighty cells (*F.*). In the space between the salivary glands and attached to the anterior border of the lobe of the fat-body lies a group of fourteen darkly stained nephrocytes (*N.v.*). A similar group of nephrocytes seems to exist in all the larvæ of Cyclorhaphous Diptera. They were described by Weismann (1864) under the name "Guirlandenförmige Zellenstrang," and by the writer as ventral nephrocytes (Keilin, *l. c.*). In the larvæ of *Lonchæa* all the nephrocytes are uninuclear cells. During the metamorphosis the ventral as well as the posterior pericardial nephrocytes undergo histolysis, though the anterior pericardial cells persist and remain filled with excretory granules throughout the life of the insect. Fig. 4 represents a pupa of *Lonchæa*, which, although in an advanced stage of metamorphosis, shows the pericardial nephrocytes through the brown chitin of the puparium.

As to the origin of the dark coloration of the nephrocytes, it is undoubtedly derived from some pigment liberated in the mangel-wurzel. This substance traverses the epithelial cells of the mid-gut, and on reaching the body-cavity is taken up by the nephrocytes. This substance behaves in much the same way as the coloured substances used by Kowalevsky and Metchnikoff, who mixed them with the food of various invertebrates, in order to detect their excretory cells.

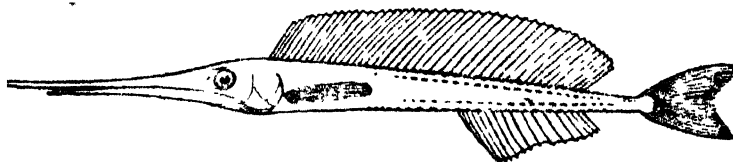
It is interesting to note that other dipterous larvæ (e. g., *Trichocera hiemalis* and *Rhyphus fenestralis*) living in the same medium and taking with their food the same pigment were never found to have their nephrocytes stained. To explain this fact we must assume that the gut of different dipterous larvæ living in the same conditions acts differently towards the same product. The same substance may be actively absorbed by the gut-cells of one larva and passed into its body-cavity, while in the gut of another larva it will never be taken up by the cells, and will leave the alimentary canal of the larva in an unchanged condition.

XXX.—*A young Swordfish (Xiphias gladius), with a Note on Clupeolabrus.* By C. TATE REGAN, M.A., F.R.S.

(Published by permission of the Trustees of the British Museum.)

ALTHOUGH adult swordfish (*Xiphias gladius*) are sufficiently abundant to be the object of fisheries, young examples of this species are rare. A few post-larval specimens have been described, and Günther ('Study of Fishes,' p. 175) has given a figure of an example said to be 8 inches long; but this figure is evidently based on the not very satisfactory one in Yarrell's 'British Fishes.' The figure now given is of a young *Xiphias*, nearly 200 mm. long, taken in the Atlantic (2° N., 22° W.); this has been in the collection of the British Museum (Natural History) since 1846.

In my paper on the Scombroids (Ann. & Mag. Nat. Hist. (8) vi. 1909, pp. 66–75) I pointed out that the resemblance of this young fish to *Blochius longirostris*, from the Upper



Young *Xiphias gladius*, $\times \frac{1}{2}$.

Eocene of Monte Bolca, established the relationship of *Xiphias* to *Blochius*. The figure will enable this resemblance to *Blochius* to be clearly seen, and will also serve for comparison with the figure of the tail-end of a specimen about twice as long, which has been described by J. T. Nichols as a new genus and species of Gempylidae, named *Phaethonichthys tuberculatus* (Amer. Mus. Novitates, no. 94, Oct. 1923). The fish described by Nichols is of interest as showing that a *Xiphias* of about 400 mm. resembles one of 200 mm. in its slender form, in the shape of the caudal fin (with the rays little divergent), and in having four series of denticulated tubercles on each side, two along the bases of the dorsal and anal fins; but it differs from the smaller fish in the lower dorsal and anal fins, the lesser size of the lateral tubercles, and the development of a keel on each side of the caudal peduncle.

In the same paper Mr. Nichols has described another supposed new genus and species from the Pacific, to which

he has given the name *Clupeolabrus dubius*. In order that this may be included in the 'Zoological Record' in its right place, I may mention that it appears to be a synonym of *Cesio tile*, Cuv. & Val., a well-known species that is widely distributed in the Indo-Pacific.

The specific name expresses Mr. Nichols's doubt as to whether this fish belongs to the *Mœnidae* or *Erythrichthyidae*; he also compares it with *Ariomma* (= *Cubiceps*, *Stromateidae*). The *Lutjanidae*, to which *Cesio* belongs, differ from the *Mœnidae* in the absence of a definite articulation between the præmaxillary and maxillary, and from the *Erythrichthyidae* in the presence of teeth (cf. Ann. & Mag. Nat. Hist. (8) xii. 1913, pp. 111-145). In view of Jordan's opinion that *Dipterygonotus* should be placed in a separate family from *Erythrichthys*, I have compared examples of these genera. *Dipterygonotus* has no supplemental maxillary, but in other characters (e. g., the toothless, very protractile mouth and the free posterior spines of the spinous dorsal fin) is so similar to *Erythrichthys* that I have no doubt as to their close relationship.

XXXI.—*Novæ Cerambycidae Formæ e Fauna Eurasiæ.*
Per N. N. PLAVILSTSHIKOV (Mosquæ).

Pogonochærus kuksha, sp. n.

Brunneo-piceus, variegatim cinereo-fusco-ochraceo tomentosus, tote corpore parce longeque setosus.

Capite dense brunneo-subpiceo tomentoso, dense crebreque punctato. Antennis longitudinem corporis vix superantibus, piceis, ab articulo tertio basi fuscis et albido annulatis (articulo quarto haud ultra medium fusco et albidi annulato); parce ciliatis.

Prothorace latitudine (ad basin) multo longiore, sat dense crebreque punctato, disco in medio depresso et sulcato, tuberculis duos longitudinalis, dense punctatis, non nitidis, instructo.

Scutello nigro velutino.

Elytris latitudine plus quam duplo ($2\frac{1}{2}$) longioribus, pone basin utrinque in tuberculum elevatis, longitudinaliter tricarinatis, apice truncatis, angulo externo dentatim producto, angulo interno subrotundato, punctis inter costas profunde impressis, seriatis, quarta elytrorum parte apicali haud punctata; macula sat magna, transversa, alba in dimidio basali

(inter costas) ornatis; fusco-æneo-ochraceo variegatim tomentosis, maculis nonnullis parvis brunneis signaturis (plus minusve seriatis); costa dorsali inferiore penicillis 4 (1 in parte basali, 3 pone medium) nigro velutinis inserta ornatis.

Tibiis femoribusque basi brunneo-ferrugineis.

Long. corp. 7 mm., lat. ad hum. 2.6 mm.

Habitat. Transcaucasia, Borshom, 12. iv. 1912 (1 spec. ♂ in coll. mea).

Primo aspectu *P. caucasicus*, Ganglb., similis, sed thoracis linea media latior sulcata, pone medium in tuberculum non elevata, tuberculis discalis dense punctatis, non nitidis, elytrorum angulo externo in spinam longam non producto, sed dentatum producto, angulo interno rotundato optime distinctus.

Ab *P. eugenice*, Ganglb., differt: colorem tomenti, elytris sub ilius punctatis, apicem in spinam longam non productis, thoracis linea media in tuberculum nitidum non elevata, etc.

Strangalia (s. str.) *quadrifasciata caucasica*, subsp. n.

Ab *Strangalia quadrifasciata quadrifasciata* (L.), colorem elytrorum dilute lividis aut dilute-livide-ferrugineis discrepat!

Fasciæ elytrorum ut ab *Str. quadrifasciata quadrifasciata* (L.), tamen sæpe plus minusve obsoletæ aut divisæ:

1. Forma typica.—Fasciæ quatuor completæ.
2. Ab. *lederi*, Ganglb.—Fascia prima in maculis divisa, secunda disjuncta (colorem elytrorum *Str. maculata*, Poda, similis).
3. Ab. *suramensis*, Plav.—Fascia prima toto deficiente.
4. Ab. *recurvata*, nov.—Fascia prima completa, secunda suturam non attingente.
5. Ab. *disjuncta*, nov.—Fascia prima completa, secunda in maculis quatuor divisa.
6. Ab. *biinterrupta*, nov.—Fascia prima in maculis 5-6, secunda in maculis 4 divisa.

Habitat. Caucasus totus, in Ciscaucasia in partem montalem plus minusve rare, in Transcaucasia sæpe. (Examinavi circa 100 specimina in coll. mea, coll. Musei Zoologici Universit. Mosquensis, coll. Musei Caucasici Tiflisiensi.)

Evodinus interrogationis, L., ab. *quadripunctatus*, nov.

Elytris flavis, maculis quatuor punctiformis nigris; macula discali secunda deficiente.

Sibiria orient.: vall. fl. Batobij, distr. Viluj, gub. Jakutensis, 24. vi. 1916 (*P. Dravert*!, coll. mea).

Evodinus interrogationis, L., ab. *recurvatus*, nov.

Ut forma typica, sed fascia dorsali postice recurvata, rectilinea, ad bordo laterali non reflexa.

Sibiria: flum. Murbaj, distr. Kirensk, gub. Irkutensis, 14. vi. 1916 (*P. Dravert!*, coll. mea).

Evodinus interrogationis, L., ab. *anticeconfluens*, nov.

Fascia discali prolongata, scutello connexa.

Rossia eur. centr.: distr. Bogoroditzk, 7. v. 1911, 23. v. 1913, et distr. Tshernensis, gub. Tulaënsis (*A. Soporjko!*).—Sibiria: Minusinsk; fl. Kondoma, Altaï, vi. 1913 (*Sobolevskij!*), Transbaicalia: Beresovka, 7–10. vi. 1915 (*D. Ogloblin!*).—Ural: pag. Metlino prope Ekaterinenburg, 20–22. vi. 1919 (*Kolosov!*).—11 specim. in coll. mea.

Evodinus interrogationis, L., ab. *posticeconfluens*, nov.

Fascia dorsali postice prolongata, cum macula apicalis connexa.

Sibiria centr. (*Staudinger!*), vall. fl. Batobij, gub. Jakutensis, 24. vi. 1916 (*P. Dravert!*).—3 specim. in coll. mea.

Evodinus interrogationis, L., ab. *confluens*, nov.

Elytris flavis, ut forma typica signaturis, sed macula marginali secunda cum fascia dorsali connexa.

Sibiria: Kuznetzkij Alatau, fl. Kondoma, vi. 1913 (*Sobolevskij!*), gub. Enissej.—Mongolia: circ. urb. Uiga, vi. 1916 (*Blazhevitsh!*).

Evodinus interrogationis, L., ab. *lateralis*, nov.

Elytris flavis, fascia dorsali, linea marginali (in tertia prima, lata), maculis humerali, circascutellari et apicali nigris.

Sibiria: Minusinsk, 1. vii. 1910 (1 spec. in coll. mea).

Evodinus variabilis variabilis (Gehl.), ab. *quinquemaculatus*, nov.

Elytris flavis, sutura, maculis quatuor marginalibus, macula apicali nigris.

Sibiria: vall. fl. Batobij, gub. Jakutensis, 24. v. 1916 (*P. Dravert!*).

Strangalia (s. str.) *thoracica*, Creutz., ab. *pliginskii*, nov.

Corpore toto rufo-ferrugineo.

Sibiria or.: Vladivostok, 10. vi. 1910 (*V. Pliginskij!*, coll. mea).

Strangalia (s. str.) *thoracica*, Creutz., ab. *basalis*, nov.

Ut forma typica, sed elytris basi ferrugineis, femoribus anticis externe rufo-ferrugineis.

Rossia centr.: pag. Vatutinki, distr. Podolsk, gub. Mosquensis, viii. 1913 (ipse!, coll. mea).

Conspectus aberrationibus *Strangaliae thoracicae*, Creutz.

1. Ab. *basalis*, Plav.—Elytris basi ferrugineis, femoribus anticis externe rufo-ferrugineis. (Rossia centr.)
2. Ab. *ussurica*, Pic.—Corpore nigro, prothorace disco elytrisque flavis. (Sibiria or.)
3. Ab. *domina*, Reitt.—Corpore rubro-aurantiaco, antennis (pars basalis excepta) abdomineque nigris. (Europa occ.)
4. Ab. *heros*, Reitt.—Corpore rubro-aurantiaco, capite, antennis presque totis, tarsis abdomineque nigris. (Eur. occ.)
5. Ab. *altaica*, Gebl.—Corpore rubro, capite, antennis articulis 1°, 2°, et 5°-11° nigris. (Sibiria.)
6. Ab. *pliginskii*, Plav.—Corpore unicolore rufo-ferrugineo. (Sibiria or.)

Strangalia (s. str.) *septempunctata*, F., ab. *panini*, nov.

Ut forma typica, sed prothorace nigro, elytris cum maculis quinque brunneseentibus: una suturali, una apicali, una discali (in tertia postica).

Bessarabia: distr. Soroki (coll. Panin=coll. mea).

Strangalia (s. str.) *septempunctata*, F., ab. *nigrithorax*, nov.

Prothorace unicolore-nigro, cetera ut forma typica.

Bessarabia (Panin, in coll. mea).

Strangalina attenuata, L., ab. *shushenicae*, nov.

Fascia prima obsoleta, in maculis tribus disjuncta, fascia secunda recurvata, marginem non attinget.

Rossia: Ukraina, prope Konotop, vii. 1911 (ipse!, coll. mea).

Xylotrechus grumi, Sem., ab. *bimaculatus*, nov.

Elytris macula una albo-tomentosa ornatis.

Turkestan bor.: Perovsk, v. (Schell!, coll. mea).

Cyrtoclytus capra, Germ., ab. *inbasalis*, nov.

Fascia prima (in parte basali) elytrorum tota deficiens.

Mantshzhuria: st. Chandochedzy, prov. Girinensis, 7. vii. 1913 (A. Alexandrov!, coll. mea).

Plagionotus pulcher, Bless., ab. *recurvatus*, nov.

Fascia prima deficiente, secunda recurvata, presque rectilinea, transversa.

Siberia or.: Ussuri (coll. mea).

Plagionotus arcuatus, L., ab. *disjunctus*, nov.

Fascia tertia in maculis tribus disjuncta: una suturali (communalis), una marginali.

Transcaucasia: Tiflis (coll. mea).

Chlorophorus varius, Müll., var. *incanus*, nov.

Corpore cinereo aut incano aut eburneo tomentoso, fasciis elytrorum sæpe indistinctis, cetera et magnitudo formæ typicæ.

Ciscaucasia: pag. Labinskaja, 25. viii. 1913 (B. Zolotarevskij!).—Transcaucasia: Teliani prope Telav, 29. v., 20. vii. 1907 (Fursov!), Aresh (Shelkovnikov!), Shach-Tshinar, distr. Kajagin, 3-10. vii. 1912 (K. Satunin!).—Bessarabia: distr. Soroki, 14, 15. vii. 1911 (Panin, leg.!).—Specimina numerosa in coll. Musei Caucasici Tiflisiensi et mea.—Verisimiliter morpha.

Dorcadion (Compsodorcadion) rufifrons, Motsch.

1. Ab. *zhuravlevi*, nov.

Ut forma typica, sed capite toto nigro.

Rossia mer. or.: circ. urb. Uralsk, 26. iv. 1911 (S. Zhuravlev!, ♂ et ♀ in coll. mea).

2. Ab. *indorsalis*, nov.

Vittis dorsalis (discalis) toto deficientibus.

Circ. urb. Uralsk, 26. iv. 1913 (S. Zhuravlev!, coll. mea).

3. Ab. *lividesuturatum*, nov.

Vitta suturali læte-pallida.

Rossia mer. or.: circ. urb. Orenburg (P. Vorontzovskij!), circ. urb. Uralsk, 24. iv. 1913 (S. Zhuravlev!). Specimina numerosa in coll. mea.

XXXII.—*Analecta Coleopterologica*.
Per N. N. PLAVILSTSHIKOV (Mosquæ).

1. *Collops dimidiatus*, sp. n.

Niger, cyaneo-micans, albido-pubescent, labro, mandibulis palpisque flavescentis, antennis articulis 1°–3° totis, 4° in parte basalis flavis, articulis 4°–9° subbrunneis, 10° brunneo, apice subpiceo; abdomine subbrunneo, segmento ultimo brunneo; tibiis, geniculis tarsisque testaceis; elytris violaceo-nigritis, fascia latissima mediana pallida ornatis.

Capite sat parce punctato, fronte depresso, vertice convexo, longitudinaliter sulcato. Prothorace capitis multo latiore subcordiforme, latitudinem suam (ad apicem) paulo longiore, ad apicem dilatato, angulis anticis rotundatis, posticis subrotundatis, basi marginato, ad apicem impresso; disperso punctato. Elytris ab humeros ad apicem forte dilatatis, apice rotundatis, distincte coriaceo-rugulosis, sat forte irregulariterque punctatis.

Long. corpor. 3 mm., lat. ad hum. 0.6 mm.

Habitat. Mantshzhuria, steppo pr. fl. Daljaoche (prov. Harbinensis), vii. 1905 (*A. Martynov* 1, 1 spec. in coll. Musei Zoologici Universit. Mosq.).

Ab omnibus congeneribus palæarcticis palæanarcticisque discrepat impimis colorem elytrorum.

Conspectus dichotomicus Specierum Generis Collops, Er.

1 (4). Elytris flavo marginatis.

2 (3). ♂ articulo antennarum 2° ingente, monstroso, quasi rotundato-triangulari.

Elongatus, micans, niger, ore, antennarum dimidia parte antica, pedibus, thoracis limbo tenui integro, limboque integro quoque elytrum circa utrumque, flavo-testaceis. Long. 4 mm.

(Sibiria: Altaï, Transbaicalia.) . . .

C. cinctus, Gebl. (1847).

3 (2). ♂ antennarum articulo 2° ingente, monstroso, difformi, infra rotundatim inciso.

Niger, ore, antennarum tribus primis articulis, thorace, elytrorum margine externo et postico, pedibusque, femoribus superne exceptis, flavo-rufis; elytris coerulescentibus; thorace antice nigro maculato. Long. 8 mm. (Asia centr.: Dahungaria.).

C. apicalis, Ball. (1878).

4 (1). Elytris flavo aut rufo non marginatis.

- 5 (6). *Niger*, *cyaneo-micans*, labro, mandibulis palpisque flavescentis, antennis articulis 1^o-3^o totis, 4^o in parte basali flavis, 4^o-9^o subbrunneis, 10^o brunneo, apice subpiceo; abdomine subbrunneo, tibiis, geniculis tarsisque testaceis; elytris violaceo-nigritis, fascia latissima mediana pallida ornatis. Long. 3 mm. (Mantszhuria.) *C. dimidiatus*, m.
- 6 (5). *Niger*, *submicans*, elytris subviridis, antennarum articulis duobus primis flavis. Long. 4 mm. (Sibiria: Transbaicalia.) ((1860). *C. obscuricornis*, Motsch.

2. *Opetiopalpus sabulosus martynovi*, subsp. n.

Capite nigro, prothorace rufo, elytris subæoneonigris, antennis (clava brunnea excepta) pedibusque pallidis, meso- et metathorace abdomineque brunneis; corpore supra brunneo, longe denseque piloso; elytris convexis, forte crebreque punctatis.

Long. corpor. 2.5 mm., lat. 0.4 mm.

Habitat. Mantszhuria: steppæ pr. fl. Daljaoche (prov. Harbinensis), vii. 1905 (*A. Martynov* 1, 1 specim. in coll. Musei Zoologici Universit. Mosquens.).

Opetiopalpi sabulosi sabulosi (Motsch.) proxime affinis, cui statura et habitus primo aspectu non dissimilis, sed certe distinctus præsertim elytris multo magis convexis, tomento multo copiose, colorem corporis.

3. *Dermestes elegans*, Solsky, var. *nadezhdæ*, nov.

Ab forma typica differt: elytris basi nigro non maculatis, fascia livide-eburnea, et non albida, ornatis; pronoto multo parcius fulvo-variegato, fortius densiusque punctato.

Long. corp. 6.6 mm.

Habitat. Asia centr.: Pamir, Tshor-Soda, 8. vi. 1898 (*N. Bogejavlenskij* 1, 1 spec. in coll. Musei Zoologici Universit. Mosquens.). Verisimiliter subspecies.

4. *Cionus* (s. str.) *simplex*, Rosenh., ab. *anticemaculatus*, nov.

Elytris macula suturali nigra in parte basali ornatis. Cetera et magnitudo formæ typicæ.

Europa or.: Ucraina, distr. Konotop, gub. Tshernigoviensis, vi. 1911 (ipse 1, 1 specim. in coll. mea).

5. *Nemosoma elongatum*, L., ab. *unicolor*, nov.

Ab forma typica differt elytris unicoloribus brunneis.

Prussia (1 spec. in coll. V. Motschulskij in Mus. Zool. Univers. Mosq.).

6. Nomine "*anthracinus*" in genere *Meligethes*, Steph. (1843), jam usitato (*Meligethes anthracinus*, Brisout, 1863, Mat. Cat. Grenier, p. 48), illam varietatem, quam *Meligethes cœruleovirens*, Först., var. *anthracinus* nominavit Seidlitz in 'Fauna Baltica,' ed. 2, 1888, p. 216, nota—*Meligethes cœruleovirens*, Först., var. *seidlitzii*, n. n., appellandam propono.

7. Nomine "*confusus*" in genere *Meligethes*, Steph. (1843), jam usitato (*Meligethes confusus*, Brisout, 1871, Abeille, viii. p. 24), illam speciem, quam *Meligethes confusus* nominavit Edmund Reitter in Berl. Ent. Zeitschr. xvi. 1872, pp. 242, 245, appellandam propono—*Meligethes edmundi*, n. n.

8. Nomine "*minimus*" in genere *Meligethes*, Steph. (1843), jam usitato (*Meligethes minimus*, Rey, 1889, 'Echange,' v. no. 52, p. 27), illam speciem æthiopicam, quam *Meligethes minimus* nominavit Grouvelle in Ann. Soc. Ent. de France, lxxv. 1896, p. 74—*Meligethes grouvellei*, n. n., appellandam propono.

9. Nomine "*bisignata*" in genere *Epuræa*, Erichs. (1843), jam usitato (*Epuræa bisignata*, Sturm, 1844, Deutsch. Ent. Insect. xv. p. 20, t. 297. fig. B), illam speciem, quam *Epuræa bisignata* nominavit Boheman in 'Insecta Cafrariæ,' i. 2, 1851, p. 56—*Epuræa bohemani*, n. n., appellandam propono.

10. Nomine "*griseus*" in genere *Byturus*, Latr. (1796), jam usitato (*Byturus griseus*, Jaene, 1882, Proc. Amer. Phil. Soc. xx. pp. 345, 346, ex California), illam varietatem, quam *Byturus æstivus*, L., var. *griseus*, nominavit Fleischer in Wiener, Ent. Zeit. xxix. 1910, p. 146—*Byturus æstivus*, L., var. *fleischeri*, n. n., appellandam propono.

11. Nomine "*arcuatus*" in genere *Byrrhus*, L. (1767), jam usitato (*Byrrhus arcuatus*, Sturm, 1843, Cat. Käfersamml. p. 98), illam varietatem, quam *Byrrhus fasciatus*, Först., var. *arcuatus*, nominavit Rey in 'Echange,' v. 1889,

p. 66—appellandam propono *Byrrhus fasciatus*, Först., var. *reyi*, n. n.

12. Nomine "*oblonga*" in genere *Syncalypa*, Steph. (1830), jam usitato (*Syncalypa oblonga*, Motsch., 1858, Etud. Entomol. p. 50), illam speciem, quam *Syncalypa oblonga* nominavit L. Ganglbauer in Münchener Kol. Zeitschr. i. 1902, p. 52—*Syncalypa ganglbaueri*, n. n., appellandam propono.

13. E. Reitter injuste traditur auctorum esse Alleculidarum qui sequuntur: *Omophlus curtulus* et *O. tumidipes*. Quæ species reverâ descripta sunt a Kirsch (cf. Schneider und Leder. Beitr. zur Kauk. Käferf. 1878, pp. 246, 247, aut Verh. Naturf. Brünn. xvii. 1878, pp. 246, 247).

Ergo citandi sunt: *Omophlus curtulus*, Kirsch (1878), et (*Omophlus tumidipes*, Kirsch (1878) (et non Reitter, 1890).

Quæ omnia in Borchmanni Catalogo corrigenda (Junk et Schenkling, 'Coleopterorum Catalogus,' pars 3, 1910, Alleculidæ).

14. N. Erschov injuste traditur auctorem esse Alleculidarum qui sequuntur: *Omophlina corva* et *O. hirtipennis*. Quæ species reverâ descripta sunt a S. Solsky (cf. A. Semenov, Revue Russe d'Entomol. vii. 1907, p. 285).

Ergo citandi sunt: *Omophlina corva*, Solsky, et *Omophlina hirtipennis*, Solsky (et non Erschov).

Quæ omnia in Borchmanni Catalogo (op. cit.) corrigenda.

15. *Strangalia* (s. str.) *quadrifasciata*, L., var. *lederi*, Ganglb., est varietas (aberratio) autonómica (non=ab. *interrupta*, Heyd., ut injuste in Revue Russe d'Entomol. xiii. 1913, p. 467, demonstravi), qua ab forma typica non solum fasciis plus minusve interruptis, tamen colorem elytrorum et distributione geographico discrepat.

16. Nomine "*interrupta*" in genere *Strangalia*, Serv. (1845), jam usitato (*Strangalia interrupta*, Newm., 1841, Entomolog. i. p. 52, ex America borealis=*Str. subhamata*, Band., 1838), illam varietatem, quam *Strangalia quadrifasciata*, L., var. *interrupta*, nominavit L. Heyden in Jahrb. Ver. Naturk. Nassau, xxix.-xxx. 1887, p. 396—appellandam propono *Strangalia* (s. str.) *quadrifasciata quadrifasciata* (L.), ab. *divisa*, n. n.

XXXIII.—*New South American small Mammals.*

By OLDFIELD THOMAS.

By the kindness of Dr. Roberto Dabbene, of the Buenos Ayres Museum, I have had the opportunity of examining a number of small mammals from different parts of S. America in the collection of that institution. Among these I find several new forms, and in working them out a couple of new subspecies in our own collection also prove to need description.

At the same time, I have described a new *Marmosa* sent from Bogotá by our helpful correspondent Brother Nicóforo Maria.

Eumops patagonicus, sp. n.

A small species with a globose brain-case.

External characters very much as in *E. bonariensis*, but the size is less, the ears rather smaller, and the antitragus shorter in proportion to its height, the length and height about equal.

Skull decidedly shorter than in *bonariensis*, with proportionally large, smooth, globose brain-case and short muzzle. Supraorbital ridges scarcely perceptible; deltoid ridges less developed.

Teeth as in *bonariensis*, but smaller throughout; canines more slender.

Dimensions of the type (measured on the spirit-specimen):—

Forearm 44 mm.

Head and body 54; tail 31; ear 14.5; across the two ears 30; lower leg and hind foot (c. u.) 22.

Skull: greatest length 17; condylo-basal length 15.8; mastoid breadth 10; interorbital breadth 4; front of canine to back of m¹ 15.8.

Hab. Chubut.

Type. Adult female. B.M. no. 23.12.12.18. Buenos Ayres no. 4068. Provisional number 37.

A well-marked species, characterized by its short rounded skull. It is the most southern member of the genus *Eumops*.

Molossops temminckii sylvia, subsp. n.

Essentially as in true *temminckii*, but the general colour above paler, near "wood-brown," as compared with the

"argus-brown" of the typical form. Light bases of the hairs more really white. Under surface also correspondingly paler, a pale fawn with the throat whiter. Ears and wings also paler.

Skull as in *temminckii*.

Dimensions of the type:—

Forearm 30 mm.

Head and body 53; tail 24; ear 12.

Skull: greatest length 14.

Hab. Corrientes. Type from Goya. 600'.

Type. Adult female. B.M. no. 98. 3. 4. 21. Collected 7th October, 1893, by R. Porrens. Presented by Oldfield Thomas. Seven specimens.

Compared with a considerable series of true *temminckii* from Sapucay, Paraguay, with which a specimen from Lamarao, Bahia, quite agrees, this Corrientes form is readily distinguishable by its much paler colour.

Phyllostomus hastatus paeze, subsp. n.

Size, as gauged by skull, very small, although the forearm is not proportionally short. General colour of back mummy-brown, across nape and shoulders rather paler than "Prout's brown."

Skull smaller than in any described race, the teeth, however, nearly as large as in true *hastatus*, and the canines particularly thick.

Dimensions of the type:—

Forearm 83 mm.

Skull: greatest length 35; condylo-basal length 32; zygomatic breadth 19; breadth across canines 9.1; mastoid breadth 17.7; premolar-molar series 9.8; basal diameter of canine 3.1.

Hab. Bogotá.

Type. Adult male. B.M. no. 99. 11. 4. 21. Collected 12th May, 1896, by G. D. Child. Presented by Oldfield Thomas. Two specimens.

This little *Phyllostomus* is evidently different from all the races mentioned in Cabrera's paper on the subject*. Its small size is particularly evident in its slender skull, while its forearm is rather disproportionately long. The canines are unusually thick.

A true *hastatus* from Guiana has the breadth across canines 10 mm. and the mastoid breadth 20.1.

* Trab. Mus. Nac. Ser. Zool. no. 31, p. 13 (1917).

Phyllostomus hastatus aruma, subsp. n.

A small Central Brazilian race.

Size of skull about as in *P. h. paeze*, but the forearm much shorter. Colour much paler, the back near wood-brown, the head and neck greyish brown.

Skull quite small, as in *paeze*, but the teeth also small, in the usual proportion, so that the tooth-row is less than in any other form of the genus. Canines of normal size.

Dimensions of the type:—

Forearm 72 mm.

Skull: greatest length 34; condylo-incisive length 30; zygomatic breadth 18.5; breadth across canines 8.2; mastoid breadth 17.4; premolar-molar series 9.4; basal diameter of canine (♀) 2.4.

Hab. Goyaz. Type from Taguatinga.

Type. Adult female. B.M. no. 23.12.12.1. Provisional number 49. Collected by Sr. Blaser. Presented by the Buenos Ayres Museum.

With the small skull of *paeze*, this animal has much smaller teeth and a shorter forearm.

Vampyrops lineatus sacrillus, subsp. n.

Like true *V. lineatus* of Paraguay in all essential respects, but the skull and teeth smaller.

Dimensions of the type:—

Forearm 48 mm.

Skull: greatest length 23.3; zygomatic breadth 14.2; intertemporal breadth 6.6; mastoid breadth 12; breadth of palate across front of m^2 9.5; front of canine to back of m^2 8.4.

Hab. Eastern Brazil. Type from Rio Dece, Espiritu Santo. Another specimen from Lagoa Santa, Minas Geraes.

Type. Adult male. B.M. no. 23.12.12.9. Provisional number 54. Presented by the Buenos Ayres Museum.

In the considerable series available of the true *V. lineatus* from Paraguay and Matto Grosso the skull is always 24.5 to 25 mm. in greatest length, and the breadth across the molars is at least 10.5 mm.

Marmosa perpusca, sp. n.

Nearly allied to *M. fuscata* of Merida, but rather larger and even darker in colour.

General colour above dark bistre, the fine ends of the hairs a warmer brown, the whole a shade darker than in

fuscata. Under surface soiled grey without median white area (except a small white spot on the throat), the hairs slaty basally and dull whitish terminally; line of demarcation not sharply marked. Head darker than back, the lighter median band inconspicuous and ending on the forehead, the crown being nearly black. Sides of muzzle and area round eyes black, much more extended than in *fuscata*. Base of tail hairy for proximal half-inch; rest naked, brown, irregularly lightening terminally, but not becoming white.

Size of skull about as in *sobrina*, larger than in *fuscata*; of the same essential shape as in those species, with a comparatively long parallel-sided interorbital area, but, owing to the type being very old, there is some trace of supraorbital ridges.

Dimensions of the type (measured on the skin):—

Head and body 135 mm.; tail 150; hind foot (wet) 19; ear (wet) 21.

Skull: greatest length 36; condylo-basal length 34.6; zygomatic breadth 17.6; interorbital breadth 6.4; breadth of brain-case 13.4; front of canine to back of m^4 14. Ms^{1-3} (worn) 5.7.

Hab. Bogotá. Type from Fusagasugá.

Type. Aged male. B.M. no. 23. 11. 13. 18. Original number 28. Collected September 1923, and presented by Brother Nicéforo María.

This species resembles *M. fuscata*, but is as large as *sobrina*. It is the darkest of the group in general colour, *sobrina* and *fuscata* being the next, while *madescens* would seem to be perceptibly lighter than either. We are again indebted to the keenness of Brother Nicéforo María for its discovery.

XXXIV.—*Some Notes on Pacas.* By OLDFIELD THOMAS.

WHILE determining some Pacas recently sent by Brother Nicéforo from Bogotá, I have had occasion to examine the characters of the different forms described from North-western South America; and, in doing so, I have to thank Prof. Lönnberg for the loan of the very valuable material from Ecuador belonging to the Stockholm Museum, and including two of the types described by him.

The Pacas belong to two groups—the lowland and the mountain Pacas,—and I have come to the conclusion that they ought to be generically separated from each other, as they

differ quite markedly in habits, habitat, and their characters both of skull and feet.

The new genus, that of the Mountain Pacas, might be called

STICTOMYS, gen. nov.

Genotype, *S. taczanowskii* (*Cælogenys taczanowskii*, Stolzmann.).

Range. Mountains of Merida, Bogotá, and Ecuador.

Externally distinguished from *Cælogenys* by the narrow compressed claws and much more profusely granulated soles. Cranially by the proportionally longer nasals, the much smaller orbits, and the more anteriorly situated postorbital processes, which are almost halfway along the combined zygomatic fossa instead of being nearly at its hinder end. The zygomata are narrower, and generally very much less rugose than in *Cælogenys*, although, as usual, there is much variation in this respect. Finally, the incisors are more orthodont, their index being about 75–80, as compared with 64–68 in *Cælogenys*.

To *Stictomys* there should be assigned the animals which have been called *taczanowskii* and *andina* from Ecuador and *sierræ* from Merida and Bogotá. In giving the varietal name *andina* to what is no doubt really *taczanowskii*, Prof. Lönnberg was deceived by his type-skull being wrongly assigned to the male sex, the male skulls more recently received corresponding very closely with that figured in Stolzmann's paper*.

Whether *sierræ* of Merida and Bogotá is specifically different from *taczanowskii* I am now somewhat doubtful, in view of the considerable variation found in these animals; but this point may be left until skins and skulls of both sexes from both localities are available for examination. But the typical female skull of *sierræ* is certainly much more robust than the corresponding one of *taczanowskii*.

With regard to the forms belonging to true *Cælogenys*, I am able to confirm Prof. Lönnberg's suggestion that *sublævis*, Gervais, was based on a female *paca*; for Dr. R. Anthony tells me that the type-skull, which is immature, is still in the Paris Museum (no. A. 7680), and he gives me such measures of it as conclusively prove that it is a *Cælogenys* and not a *Stictomys*. But the name will have to be used for the Bogotá form, should that prove separable from the true *paca* of North-eastern Brazil.

* P. Z. S. 1885, p. 165.

Whether, again, the Ecuador *guanta* and the Peruvian *thomasi* will prove to be distinct from *sublævis* can only be settled on the examination of further material from the various localities concerned.

XXXV.—On some Ceylon Mammals.

By OLDFIELD THOMAS.

By the kindness of Mr. W. W. A. Phillips, who has been studying the mammals of Ceylon, I have been permitted to examine some specimens obtained by him at Mouskande, Gammadawa, in the Central Province, at 3000'. He has himself recognized their interest, but has asked us to work them out.

HERPESTES FLAVIDENS AND ITS RACES.

Of *Herpestes flavidens*, the Ceylon brown mongoose, there would appear to be several different races, varying in the intensity of their coloration very much in accordance with the degree of humidity in the different areas.

The type-form—true *flavidens*—was described from Kandy (1654'), and extends across the highest region of the island to Newera Ellia (6188') and Pattipola (6210'), where Maj. Mayor obtained specimens now in the Museum.

In this the general colour is a strong brown, near "Brussels-brown," and the face is also brown, little or not paler than the back.

Compared with this, two specimens sent by Mr. Phillips from Mousekande, about 40 miles N.N.E. of Kandy, evidently belong to a different race, which would seem to be new, and may be diagnosed as follows:—

Herpestes flavidens phillipsi, subsp. n.

Essential characters as in true *flavidens*, but the colour a much greyer and more olivaceous brown (near "hair-brown"), the face showing this greyer colour even better as compared with the brown face of *flavidens*.

Dimensions of the type (as measured by Mr. Phillips):—

Head and body 405 mm.; tail 288; hind foot 74; ear 28.

Skull: greatest length 80; condylo-basal length 76.

Hab. Mouskande Estate, Gammadawa, Central Province.
Alt. 3000'.

Type. Adult male. B.M. no. 23. 12. 15. 1. Original number 362. Collected 25th August, 1923, and presented by W. W. A. Phillips, Esq. Paratype in Colombo Museum; original number 744.

Fortunately the Museum possesses a topotype of *flavidens* from Kandy, so that there is no difficulty in deciding to which form that name belongs.

In the lower parts of the island there is in the south-west a more or less reddish form, to which the name *maccarthiae* appears to be applicable (type in Museum, exact locality unknown; one example from Anasigalla, Matugama, 100', coll. Phillips). Then, along the eastern area a still darker brown form is found, for which the name *ceylonicus*, Nevill, may be provisionally used, with type-locality Trincomali—a specimen in the Museum from Kambukkan, Uva Province.

Furthermore, there is in the Museum a skin collected by the well-known Ceylon naturalist Mr. E. W. H. Holdsworth which was said to come from Kandy, but whose characters are quite inconsistent with those of specimens from that area, and I am convinced the locality is wrong. Another specimen, quite typical *flavidens*, was sent at the same time as from Kandy, and no doubt this locality was improperly assigned at the Museum to both.

Now, the first-named skin represents exactly the form that might be expected from the dry area in the north-west of the island, and since Mr. Holdsworth made considerable collections at Aripo, near Mannar*, it is highly probable that this specimen was obtained there. In any case, it represents a distinct subspecies, which may be described as

Herpestes flavidens siccatus, subsp. n.

General colour pale sandy brown or sandy buffy, this colour extending over the whole body, above and below, the bases of the fur dark grey-brown. Forehead and nape slightly darker; cheeks and area behind ears slightly lighter. Limbs darkening terminally, the metapodials grizzled brown and the digits black. Tail-hairs sandy throughout, like the body.

Dimensions of the type:—

Hind-foot (wet) 71 mm.; ear 27.

Type. Adult male. B.M. no. 72. 4. 17. 1. Collected by Mr. E. W. H. Holdsworth.

This subspecies is readily distinguishable by its pale sandy colour.

* See his paper on the birds of Ceylon, P. Z. S. 1872, p. 407.

Mongoose referable to *H. flavidens* are decidedly rare, and the available series is very small, but the differences between the races are quite in accordance with what is found in other groups of Cinghalese mammals.

This discrimination of the local forms of *H. flavidens* is entirely due to Mr. Phillips, who has drawn our attention to the facts, and has collected and presented several of the specimens on which I have based this notice. He wished the name of *H. f. phillipsi* to be one which would recall the name of the Mousekande Estate, where he received much kindness and help, but I have felt that the name I have given is even better deserved.

Funambulus layardi, Blyth.

Mr. Phillips sends two skins referable to this squirrel from Mousekande, and suggests that they represent a race different from that which he knows at Ratnapura and other localities in the neighbourhood of the latter place. On examining the material, I find that he is certainly right as to their being different, but the allocation of the names is not as he supposes; for the type of *layardi* came from the Ambigamo Hills, which are in the highlands of the Central Province (7° N., 80° 30' E.), where the form would presumably be the same as that from Mousekande, and it is the Ratnapura form which needs description. Moreover, two specimens in the Museum collection, sent by Blyth as his *layardi*, are absolutely like the Mousekande examples.

Funambulus layardi signatus, subsp. n.

Similar in all respects to true *layardi*, but the light median dorsal line, instead of being narrow (about 3 mm.) and pale buffy, is broader (nearly 5 mm.) and of a rich ochraceous or flame-colour.

Dimensions of the type:—

Head and body 155 mm.; tail 145; hind foot 35; ear 14.

Skull: greatest length 39.3; condylo-incisive length 34.6.

Hab. Region round Ratnapura, Southern Ceylon. Type from Ratnapura, 115'. Other specimens from Rasagalla, Balangoda, 1250', and Rakwana, S.E. of Ratnapura.

Type. Adult male. B.M. no. 15.8.1.73. Original number 1106. Collected 17th February, 1914, by Maj. E. W. Mayor. Presented by the Bombay Natural History Society.

The richness of the dorsal stripe in this form recalls that of the lateral stripes in *Tamiops macrolellandei barbei*.

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Layard's squirrel is here provisionally kept in the genus *Funambulus*; but after Mr. Pocock's paper, founding *Tamiodes* on *F. tristriatus* *, it is evident that a study of its glans penis and baculum will be needed before its proper position can be determined.

Cælomys bicolor, Thos.

Mr. Phillips also obtained a specimen of this rare mouse, hitherto only known from one Kottawa specimen, at Mousekande, 3000', a considerable extension of its known range.

XXXVI.—*Revised Lists of Species of the Genera Arcyptera, Mecostethus, Parapleurus, and Ramburiella (Orthoptera, Acrididæ).* By B. P. UVAROV, F.E.S.

THE confusion in the nomenclature of the four genera named in the title is well-known to all orthopterists, and is due to repeated shifting, and even interchanging, of the generic names. W. F. Kirby, in his Catalogue, made an attempt to fix the genotypes of the genera concerned, but he has done it without paying any regard to previous authors, and his conclusions in that respect are nearly all unacceptable; moreover, he has made a number of most serious mistakes in the assignment of species to genera. In the following pages I am going to discuss briefly the nomenclature of the genera and the problem of the genotypes, as well as to give revised and brought-up-to-date lists of species of each genus, with their distribution. As regards the synonymy, I will give only the original quotations, the recently established synonyms, and references to the Catalogue by Kirby where full synonymy may be found.

Genus ARCYPTERA, Serv.

1839. *Arcyptera*, Serville, Ins. Orth. p. 743.

1910. *Arcyptera*, Kirby, Syn. Cat. Orth. iii. p. 169.

Serville originally included in the genus two species—*Edipoda cothurnata*, Creutz. (= *fusca*, Pall.), and *O. parallela*, Zett.,—but the genotype has been fixed already in 1846 by Fischer de Waldheim (Orth. Imp. Ross. p. 333) as *O. cothurnata*.

* P. Z. S. 1923, p. 215.

Eight Palæarctic species are known, with four additional subspecies, some of the species being also, probably, only geographical races.

1. *Arcyptera fusca* (Pall.).

1773. *Gryllus Locusta fusca*, Pallas, Reise, ii. p. 727.

1910. *Arcyptera fusca*, Kirby, l. c. p. 169.

Distribution. Palæarctic Region, except in the South.

1 a. *Arcyptera fusca albogeniculata*, Ikon.

1911. *Arcyptera fusca*, var. *albogeniculata*, Ikonnikov, Ann. Mus. Zool. Acad. Imp. Sci. St. Petersb. xvi. p. 250.

Distribution. Eastern Siberia.

2. *Arcyptera tornosi*, Bol.

1884. *Arcyptera tornosi*, I. Bolivar, C. R. Soc. Ent. Belg. xxviii. p. civ.

1910. *Arcyptera tornosi*, Kirby, l. c. p. 170.

Distribution. Spain.

3. *Arcyptera microptera* (F.-W.).

1833. *Edipoda microptera*, Fischer de Waldheim, Bull. Soc. Nat. Moscou, vi. p. 384.

1846. *Edipoda cruciata*, Fischer de Waldheim (nec Charp.!), Orth. Imp. Ross. p. 315, pl. xv. fig. 6.

1853. *Arcyptera stollii*, Fieber, Lotos, iii. p. 99.

1853. *Stauronotus flavicosta*, Fischer, Orth. Europ. p. 353.

1910. *Arcyptera flavicosta*, Kirby, l. c. p. 171.

Distribution. Steppes of the Palæarctic Region.

The description of *O. microptera* and especially its figure in the later work by Fischer de Waldheim leave no doubt as to identity of the species, and the name must stand. *A. stollii* also undoubtedly belongs here, but without synonyms quoted by its author.

3 a. *Arcyptera microptera crassiuscula* (Zub.).

1898. *Stethophyma flavicosta*, var. *crassiuscula*, Zubowsky, Ann. Mus. Zool. Acad. Imp. Sci. St. Petersb. iii. p. 95.

1900. *Stethophyma flavicosta*, var. *crassiuscula*, Zubowsky, Horæ Soc. Entom. Ross. xxxiv. p. 16.

Distribution. Semiretchye, Altai.

It is not impossible that *A. cothurnata* (= *fusca*), var. *femorialis*, F.-W. (Orth. Imp. Ross. p. 334), from Dzhungaria, belongs here, in which case the name *femorialis* must

be adopted for the race ; but Fischer's description is far too brief.

3 b. *Arcyptera microptera sibirica*, Uv.

1914. *Arcyptera flavicosta sibirica*, Uvarov, Ann. Mus. Zool. Acad. Imp. Sci. St. Petersburg. xix. p. 170.

Distribution. E. Siberia.

3 c. *Arcyptera microptera transcaucasica*, Uv.

1917. *Arcyptera flavicosta transcaucasica*, Uvarov, Bull. Mus. Caucase, xi. p. 281.

Distribution. E. Transcaucasia.

4. *Arcyptera kheili*, Azam.

1900. *Arcyptera kheili*, Azam, Bull. Soc. Entom. France, p. 82.

1910. *Arcyptera kheili*, Kirby, l. c. p. 171.

Distribution. S. France.

5. *Arcyptera carpentieri*, Azam.

1907. *Arcyptera carpentieri*, Azam, Bull. Soc. Entom. France, p. 262.

Distribution. S. France.

6. *Arcyptera marica*, Navas.

1908. *Arcyptera marica*, Navas, Bol. Soc. Aragon. vii. p. 09.

Distribution. Aragon.

7. *Arcyptera brevipennis* (Br. W.).

1861. *Stethophyma variegatum*, var. *brevipennis*, Brunner v. Watt. Verh. z.-b. Ges. Wien, xi. p. 305.

1910. *Arcyptera brevipennis*, Kirby, l. c. p. 170.

Distribution. Istria, Dalmatia, E. Italy.

8. *Arcyptera labiata* (Brullé).

1832. *Podisma labiata*, Brullé, Expl. Morée, Ins. p. 95.

1910. *Arcyptera labiata*, Kirby, l. c. p. 170.

Distribution. Greece, Smyrna ; (records from Transcaucasia and Transcaucasia are erroneous),

As regards seven more species included by Kirby in *Arcyptera*, they do not belong to this genus. Thus, the four North American species are all members of the genus *Mecostethus*, and so is *Mecostethus magister* of Rehn; *Stethophyma amabile*, Kraus, from Senegal, has been made by Bolivar the type of his genus *Kraussella* (Bol. R. Soc. Esp. Hist. Nat. 1909, p. 292), and *Gryllus morio*, F., from "Africa," cannot be identified generically until the type is known, if it still exists. *Arcyptera caerulipes*, Karny, described from the French Guinea (Zoolog. Jahrb., Syst. xi. 1915, p. 135), belongs almost certainly to an undescribed genus.

Genus RAMBURIELLA, Bol.

- 1897. *Ramburia*, I. Bolivar (nec Rob.-Desv.), Actas Soc. Esp. p. 168.
- 1906. *Ramburiella*, I. Bolivar (nom. nov.), Bol. Soc. Esp. vi. p. 303.
- 1910. *Ramburiella*, Kirby, l. c. p. 165.
- 1910. *Pallasiella*, Kirby, l. c. p. 168.
- 1915. *Pallasiella*, I. Bolivar, Trab. Mus. Nac. Madrid, ser. zool. no. 20, p. 54.
- 1915. *Ramburiella*, I. Bolivar, l. c.
- 1923. *Ramburiella*, Uvarov, Trans. Ent. Soc. London, p. 158.

The genus has been based by its author on *Gryllus hispanicus*, Ramb., but two more Mediterranean species must be included in it, since I cannot regard the characters given by I. Bolivar (l. c. 1915, p. 54) for separating *Ramburiella* from *Pallasiella* as being of generic value.

1. *Ramburiella hispanica* (Ramb.).

- 1838. *Gryllus hispanicus*, Rambur, Faune Andal. ii. p. 88.
- 1910. *Ramburiella hispanica*, Kirby, l. c. p. 165.

Distribution. S. France, Spain, Algeria.

2. *Ramburiella bolivari* (Kuthy).

- 1907. *Stethophyma bolivari*, Kuthy, Ann. Mus. Hungar. v. p. 431.
- 1910. *Stethophyma bolivari*, Kirby, l. c. p. 168.
- 1910. *Arcyptera elegans*, Uvarov, Horae Soc. Entom. Ross. xxxix. p. 370.
- 1919. *Pallasiella bolivari*, Uvarov, Bull. Mus. Caucase, xii. p. 155.

Distribution. Asia Minor, Persia, S. Transcaucasia, Transcaspia, S. Kirghiz Steppes.

3. *Ramburiella turcomana* (F.-W.).

- 1833. *Edipoda turcomana*, Fischer de Waldheim, Bull. Soc. Nat. Moscou, vi. p. 384.
- 1848. *Edipoda truchmana*, Fischer de Waldheim, Orth. Imp. Ross. p. 313.
- 1910. *Pallasiella turcomana*, Kirby, l. c. p. 168.

Distribution. Macedonia, Asia Minor, Palestine, Persia, Mesopotamia, Transcaucasia, Turkestan, Caspian Steppes.

It is impossible to decide to which genus belongs *Ædipoda signata*, F.-W., from the Kharkov province, S. Russia, referred by Kirby to *Ramburiella*; if it really belongs here, it must be identical with *R. bolivari*, but the latter insect is not known from the South Russian Steppes and not likely to occur there. *Arcyptera carvalhoi*, I. Bol., included by Kirby in *Pallasiella*, has been made by I. Bolivar the type of his genus *Pseudourcyptera* (Bol. Soc. Esp. 1909, p. 295).

Genus PARAPLEURUS, Fisch.

1853. *Parapleurus*, Fischer, Orth. Europ. pp. 297, 363.

1910. *Mecostethus*, Kirby, l. c. p. 144.

I do not know what induced Kirby to regard *alliaceus* as the genotype of *Mecostethus*, Fieb. (nec Kirby), but the history of the genera *Mecostethus* and *Parapleurus* shows that Kirby simply need not trouble about fixation of their types, since it has been actually done long before him. In fact, Fieber [in Kelch, Orth. Oberschles. p. 1 (1852)] included in his genus *Mecostethus* two species—*parapleurus*, Hag. (= *alliaceus*, Germ.), and *grossus*, Charp. (= *grossum*, L.),—without any indication which one of them should be considered the genotype. The first author who separated *grossus* and *alliaceus* generically was Fischer (l. c.), who, in 1853, divided the genus *Mecostethus* in two—*Parapleurus* and *Stethophyma*,—quoting under both “*Mecostethus* Fieb. ex part.,” and making thereby quite plain that his two new genera are only parts of *Mecostethus*, Fieb. As Fischer founded his new genus *Parapleurus* on a single species—*typus*, Fisch. (= *alliaceus*, Germ.),—this must be considered as a valid fixation of the genotype of *Parapleurus*, while *grossus* becomes mechanically the genotype of *Mecostethus*, Fieb. Even if we would not accept this view, there are in the subsequent literature two more cases which must be regarded as formal fixation of genotype of *Parapleurus*, and in both cases it was *alliaceus*, L.; I refer to works by Frivaldszky [Ertek. Term. Köreb. i. 12 (1867)] and Brunner [Prodromus Europ. Orth. (1882)], who redescribed the genus with the above single species in it. Thus, Kirby was not at liberty to fix the genotype in 1910, ignoring all previous literature, and his definition of *alliaceus* as genotype of *Mecostethus*, which would make *Parapleurus* a pure synonym of *Mecostethus*, is not valid.

Three species are known in the genus *Parapleurus* :—

1. *Parapleurus alliaceus* (Germ.).

1817. *Gryllus alliaceus*, Germar, Fauna Ins. Europ. xi. pl. xix.

1910. *Mecostethus alliaceus*, Kirby, l. c. p. 145.

Distribution. Palæarctic Region.

2. *Parapleurus fastigiatus* (Rehn).

1902. *Parapleurus fastigiatus*, Rehn, Proc. Acad. Nat. Sci. Philad. liv. p. 629.

1910. *Mecostethus fastigiatus*, Kirby, l. c. p. 145.

Distribution. Japan.

3. *Parapleurus koshunensis* (Shir.).

1910. *Parapleurus koshunensis*, Shiraki, Acrid. Japans, p. 14.

Distribution. Formosa.

Parapleurus armillatus, Karny, described recently from Formosa (Suppl. Entom. no. 4, 1915, p. 83), belongs to the genus *Ceracris* (see my note in Ann. & Mag. Nat. Hist. ser. 9, vol. vii. 1921, p. 486).

Genus MECOSTETHUS, Fieb.

1852. *Mecostethus*, Fieber, Kelch, Orth. Oberschles. p. 1.

1853. *Stethophyma*, Fischer, Orth. Europ. p. 297.

1910. *Stethophyma*, Kirby, l. c. p. 167.

As I have said above, under *Parapleurus*, Fischer, in 1853, removed one of the two original species of *Mecostethus* into his new genus *Parapleurus*, leaving thus *grossus*, L., as the only possible genotype of *Mecostethus*. Unfortunately Fischer did not preserve the latter name for one of the two genera into which he split *Mecostethus*, but described both of them as new. In his *Stethophyma* he included two species—*grossum* and *variegatum*, Sulz. (= *fusca*, Pall.),—without indicating the genotype. The latter, however, has been fixed by Frivaldszky in 1867 (l. c.), who redescribed *Stethophyma*, with *grossum* as its only species; and this makes *Stethophyma* a pure synonym of *Mecostethus*. It may be mentioned also that Brunner in 1882 (l. c.) redescribed *Mecostethus*, with a single species in it, viz., *grossus*; so that here, again, Kirby had no right whatever to introduce his own views regarding genotypes of *Mecostethus* and *Stethophyma*, which only resulted in interchanging of several well-known generic

names and in a confusion in the generic conceptions. So great was this confusion, in fact, that Kirby himself was quite unable to refer several species to proper genera, and made a number of most unfortunate mistakes in this respect. Thus, he included in *Stethophyma* (as he called *Mecostethus*) two species only, and one of them quite erroneously, while five more have been included by him in *Arcyptera*.

1. *Mecostethus grossus* (L.).

1758. *Gryllus Locusta grossus*, Linné, Syst. Nat. ed. x. l. p. 433.

1910. *Stethophyma grossum*, Kirby, l. c. p. 167.

Distribution. Palearctic Region.

2. *Mecostethus tscherskii* (Ikonn.).

1911. *Stethophyma tscherskii*, Ikonnikov, Ann. Mus. Zool. Acad. Imp. Sci. St. Petersb. xvi. p. 249.

Distribution. E. Siberia.

3. *Mecostethus magister*, Rehn.

1902. *Mecostethus magister*, Rehn, Proc. Acad. Nat. Sci. Philad. liv. p. 631.

1910. *Arcyptera magister*, Kirby, l. c. p. 171.

Distribution. Japan.

4. *Mecostethus lineatus* (Scudd.).

1862. *Arcyptera lineata*, Scudder, Boston Journ. Nat. Hist. vii. p. 462.

1910. *Arcyptera lineata*, Kirby, l. c. p. 172.

Distribution. Canada, United States.

5. *Mecostethus gracilis* (Scudd.).

1862. *Arcyptera gracilis*, Scudder, l. c. p. 463.

1910. *Arcyptera gracilis*, Kirby, l. c. p. 172.

Distribution. Canada, United States.

6. *Mecostethus platypterus* (Scudd.).

1862. *Arcyptera platyptera*, Scudder, l. c. p. 463.

1910. *Arcyptera platyptera*, Kirby, l. c. p. 172.

Distribution. United States.

7. *Mecostethus doranii* (Goding).

1890. *Stethophyma doranii*, Goding, Entom. Americ. vi. p. 13.

1910. *Arcyptera doranii*, Kirby, l. c. p. 172.

Distribution. Tennessee, United States.

THE ANNALS
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[NINTH SERIES.]

No. 75. MARCH 1924.

XXXVII.—*Some Indian Coleoptera* *.
By G. C. CHAMPION, F.Z.S.

THE thirteenth contribution to this series is based upon a study of various additional Malacoderm and other beetles captured by my two sons in Northern India, by Mr. H. Stevens in Sikkim, by Mr. H. L. Andrewes in the Nilgiris and Burma, and by Mr. Stanley Kemp (of the Zoological Survey of India) in the Palni Hills, S. India. The discovery of a third species of *Psephenoides* in abundance at a lower level in Kumaon is of particular interest, as it differs from the two others in having the elytra contiguous along the suture in both sexes and the antennal joints 3-7 of the ♀ feebly ramose. Five species of *Ichthyurus* are added. This genus now includes about 100 named Eastern forms (92 were catalogued by Dr. Gestro in 1905, against the 10 of the Munich Catalogue, 1869), many of which inhabit Southern India, Ceylon, Burma, and the Malayan region.

One of the Himalayan representatives, in the absence of the ♂, was previously confused by me with *I. maculifrons*. Three species of *Silis*, a genus also well represented in India, are additions to the *S. maindroni*, Bourg., group.

* The present article forms Part 13 of this series; Parts 1-12 have been published in the 'Entomologist's Monthly Magazine,' the last instalment appeared in vol. lix. (Dec. 1923).

The insects enumerated, the types of which are in the British Museum unless otherwise stated, are as follows, the genera marked with an asterisk being additions to the Indian fauna :—

HELODIDÆ (Reitter).

- Eubria minima*, sp. n.
 **Schinostethus nigricornis*, Waterh.,
 ♂.
Psephenoides volatilis, sp. n.

TELEPHORIDÆ.

- Silia pectinicornis* (Guér.), sp. n.
 „ *lividipennis*, sp. n.
 „ *palmarum*, sp. n.
Malthinus stramineus, sp. n.
Ichthyurus ranikhetensis, sp. n.
 „ *nigricauda*, sp. n.
 „ *tridens*, sp. n.
 „ *annulatus*, sp. n.
 „ *malthiniformis*, sp. n.

MELYRIDÆ.

- Attalus palniensis*, sp. n.
 „ *sejunctus*, sp. n.
Hyppobius naimensis, Champ., ♂.

SPHINDIDÆ (Reitter).

- Aspidiphorus asiaticus*, sp. n.

MELANDRYIDÆ.

- **Tetraloma cyanoptera*, sp. n.

PYTHIDÆ.

- **Sphaeristes nigrocyaneus*, sp. n.

EUBRIA, Germ.

Eubria minima, sp. n.

Short, broad-oval, convex, shining, finely pubescent; black, the antennal joints 1 and 2, legs, and a large patch at the anterior angles of the prothorax testaceous, the rest of the antennæ black or infusate; densely, excessively minutely punctate, the elytra each with five feebly-punctured, equidistant, fine striæ, 1-3 complete, 2 and 3 sinuous, 4 and 5 abbreviated anteriorly; antennæ (♂) about as long as the body, serrate, moderately stout, (♀) a little shorter and much more slender; eyes rather small.

Length 1-1½ mm.

Hab. Haldwani Division of Kumaon (H. G. C.).

One pair. A short, diminutive form of *E. semistriata* (Ent. Mo. Mag. lvii. 1921, p. 204), somewhat rotundate in shape, with much less dilated antennæ in ♂, the elytra finely, subequally 5-striate to apex (in *E. semistriata* the outer striæ are more numerous and the second is confined to the apical half), the legs testaceous. The striation of the elytra cannot be seen properly till the pubescence is removed. *E. semistriata* was found at a much higher elevation, Haldwani being near the foot-hills.

SCHINOSTETHUS, Waterh.

Schinostethus nigricornis, Waterh.

Schinostethus nigricornis, Waterh. Cist. Ent. ii. p. 504 (♀) (1880).

♂. Antennæ with joints 4–10 strongly flabellate, 3 stout, elongate-triangular, produced at tip, the ramus on 4 and 5 shorter than the rest.

♀. Antennæ shorter, sharply serrate.

Hab. INDIA, Shillong, Assam (*F. W. C.*: ♂), W. Almora, Kumaon (*H. G. C.*: ♂ ♀: viii. 1917, vi. 1918), Bhowali, Kumaon, alt. 5700 ft. (*Dr. Imms*), Darjeeling (*Brunetti*: ♂: *Mus. Calcutta*); ? N. CHINA (type).

The type of this species is labelled "China (*ex coll. Bowring*)," a locality requiring confirmation; there is, however, in the British Museum a broken example of a smaller unnamed form, with much larger eyes, from Singapore. *S. nigricornis* is a broad-oval, brick-red, pruinose Eubriid, with the antennæ black (the two testaceous basal joints excepted), flabellate in ♂, and serrate in ♀. Waterhouse correctly surmised the sex of the specimen he described. The genus is an addition to the Indian fauna.

PSEPHENOIDES, Gahan.

Psephenoides volatilis, sp. n.

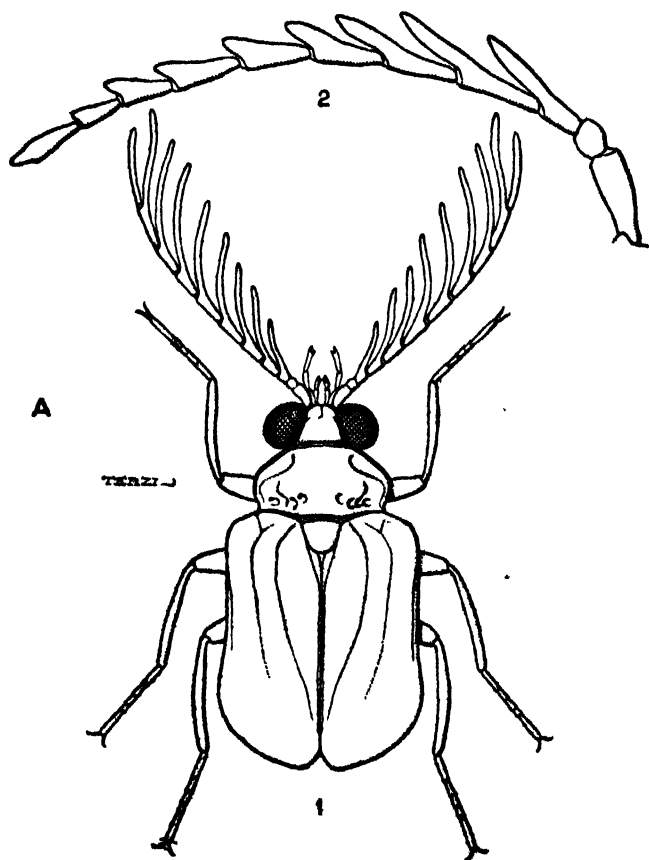
(Figs. A, 1, ♂; A, 2, ♀, antenna.)

♂. Broad, depressed, shining, the elytra duller, finely pubescent; varying in colour from piceous to (in immature examples) obscure testaceous, the eyes and antennæ (except at base) black, the latter in immature examples fuscous, with the apices of joints 3–6 and the basal joints entirely testaceous, the legs also testaceous; the head and prothorax very finely, the elytra densely, punctulate. Head (with the eyes) nearly as broad as the prothorax, the eyes convex, enormously developed, much wider than the space between them; antennæ as long as or longer than the body, closely studded (joint 1 excepted) with minute asperities, joints 3–10 each bearing a very long, slender, flexible ramus; apical joint of maxillary palpi with two narrow processes at the tip (as in *P. gahani*, see Ent. Mo. Mag. 1920, p. 195, fig. 2), that of the labial pair with a dentiform prominence towards the apex. Prothorax transversely quadrate, obliquely

narrowed anteriorly, uneven. Scutellum very large, subtriangular, hollowed down the middle. Elytra much wider than the prothorax, contiguous along the suture, subquadrate. Legs very elongate, the tibiæ and tarsi slender.

♀. Eyes smaller, about as wide as the space between

Fig. A.



1. *Psephenoides volatilis*, sp. n., ♂ ; 2, antenna, ♀.

them ; antennæ (fig. A, 2) about one-half shorter, slender, joints 3-7 each bearing a moderately long ramus, the rami gradually decreasing in length, 8-10 feebly serrate ; scutellum broader, transverse.

Length 2-3, breadth $1\frac{1}{4}$ - $1\frac{1}{2}$ mm. (♂ ♀.)

Hab. Haldwani Division, Kumaon (*H. G. C.*: v. 1921, vi. 1923), Ranikhet (*H. G. C.*).

Found in abundance "at light," the two sexes in about equal numbers, at Haldwani, all these specimens being immature; a single imperfect mature ♂ at Ranikhet. Separable from *P. gahani* and *P. immsi* by the contiguous elytra (the metanotum thus being wholly covered), the less transverse scutellum, the enormous eyes of the male, and the short rami on the antennal joints 3-7 in the female. These rami are entirely wanting in the ♀♀ of the two other known species of the genus; the antennæ in the latter are simply serrate in this sex (see fig. 1, *Ent. Mo. Mag.* 1920).

A smaller, rougher, mature ♂, with a deeply sulcate prothorax, from the Pykara, Nilgiris, alt. 6500 ft. (*H. L. Andrewes*), may belong to the present species; and a ♀ from Ranikhet (*H. G. C.*), with extremely long tarsi, is possibly referable to *P. immsi*, the types of which are much larger examples of the same sex.

Silis, Latr.

Silis pectinicornis, sp. n.

♂ *Silis pectinicornis*, Guér. in Gemm. and Harold, *Cat. Coleopt.* vi. p. 1676 (ined.) (1869).

♂. Elongate, shining, cinereo-pubescent; black, the mandibles in part, labrum, prothorax, and bases of the tibiæ testaceous or rufo-testaceous; the head and prothorax very sparsely, extremely minutely punctulate, the transverse basal furrow of the latter with a row of coarser punctures, the elytra densely rugulosely punctured and with feebly raised lines on the disc. Head transversely depressed between the eyes, the latter extremely large, convex, each as seen from above nearly as broad as the space between them; antennæ stout, very elongate, flabellate, the ramus on each of the joints 3-10 about as long as the joint itself. Prothorax (fig. B, 3) transverse, rather convex, much narrowed anteriorly and deeply, abruptly constricted at the base, sulcate down the centre posteriorly; the margins dilated at the middle into a curved, backwardly-directed, reflexed, lamelliform tooth, immediately behind which is a narrow, outwardly-dilated, blunt tooth. Elytra elongate, at the base about as wide as the prothorax. Tarsal claws slightly widened at the base.

♀. Head much smaller, the eyes greatly reduced in size, about one-third the width of the broader interocular space;

antennæ much shorter, joints 3-10 elongate-triangular. Prothorax (fig. B, 4) less constricted at the base, the margins simply dilated and reflexed in their median third, the narrow tooth wanting, the hind angles acute. Elytra broader than the prothorax.

Var. Prothorax with a mesially-constricted black median vitta. (♀.)

Length $5\frac{1}{2}$ -7 mm. (♂ ♀.)

Hab. Bengal (*Guérin*); Ranikhet [types], W. Bhatkot, W. Almora, and Sunderdhunga (typical form and var.), all in Kumaon, alt. 4000-12,000 ft. (*H. G. C.*: v. 1919, v. 1920, &c.).

Found in plenty in Kumaon. Very like *S. maindroni*, Bourg. (see figs. B, 1, 2, ♂ ♀), from Coonoor in the Nilgiris; the prothorax (except in var.) wholly testaceous, more constricted at the base, and more narrowed anteriorly in both sexes, the lateral dilatation in ♂ broader, oblique, very prominent, and followed by a narrow truncated tooth; the eyes in ♂ enormously developed. Bourgeois does not mention Guérin's MS. name *pectinicornis*, which can quite well be used for the Kumaon insect. The variety is represented by one ♀ example.

Silis lividipennis, sp. n.

♂. Very like the same sex of *S. pectinicornis*; the prothorax with a broad, sharply-defined, trifurcate, black patch on the anterior half, the elytra dilute fuscous or fusco-testaceous, the legs sometimes similarly coloured; head triangularly depressed between the eyes, the latter equally large; antennæ still more elongate, as long as the body, the rami longer than the joints themselves; prothorax (fig. B, 5) with the lateral dilatation more extended anteriorly and hollowed externally, the posterior portion forming a prominent curved tooth in front of the slender one behind it; elytra a little more elongate.

♀. Eyes small; antennæ much as in *S. pectinicornis*; prothorax (fig. B, 6) simply constricted before the base, the hind angles acute, the black transverse patch reaching the outer margin.

Length $6\frac{7}{8}$ mm. (♂ ♀.)

Hab. Nilgiri Hills (*H. L. Andrewes*).

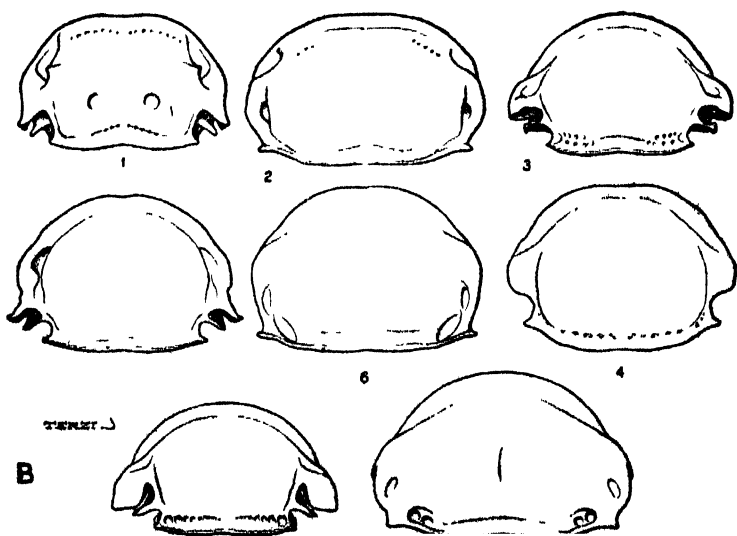
Numerous examples. A larger and more elongate insect than *S. maindroni* and *S. pectinicornis*, the black patch on the prothorax confined to the anterior half, the elytra livid or fuscous in colour; the eyes of the ♂ extremely large, as in

S. pectinicornis, the antennal rami as long as in the same sex of *S. maindroni*; the prothorax of the ♂ shaped as in *S. maindroni*, except that the sides are more deeply sinuate, appearing sharply dentate in front of the small narrow tooth. In *S. maindroni*, from the same region, the eyes are small in both sexes, and the black median patch on the prothorax sometimes extends over the whole surface.

Silis palnianus, sp. n.

♂. Very like the same sex of *S. pectinicornis*, the prothorax with a small fuscous spot on the disc, the elytra green, the legs wholly black; eyes much smaller; antennæ strongly pectinate, shorter, with shorter rami; prothorax

Fig. B.



- 1, *Silis maindroni*, Bourg., prothorax of ♂; 2, ditto, of ♀. 3, *S. pectinicornis*, sp. n., prothorax of ♂; 4, ditto, of ♀. 5, *S. lividipennis*, sp. n., prothorax of ♂; 6, ditto, of ♀. 7, *S. palnianus*, sp. n., prothorax of ♂; 8, ditto, of ♀.

(fig. B, 7) with the lateral lamelliform expansion broader and extending further backward, more hollowed above, the narrow tooth behind it similarly placed. Elytra more rugose and with less distinct costæ.

♀. Eyes small; antennæ much as in *S. pectinicornis*; prothorax (fig. B, 8) nearly as broad as the elytra, feebly constricted before the base, the hind angles sharp, the disc fusco-vittate down the middle.

Length 6-6½ mm.

Hab. Palni Hills, Neutral Saddle, alt. 5000 ft. (*S. Kemp*: ix. 1922: *type in Calcutta Museum*).

One ♂, two ♀ ♀. Separable from the three allied forms by the metallic elytra. The ♂ with much larger eyes than in *S. maindroni*, Bourg., nearly as large as in *S. pectinicornis* and *S. lividipennis*; the prothorax shaped somewhat as in *S. maindroni*; and the antennæ with much shorter rami than in any of these insects.

The four Indian species of this genus with flabellate or strongly pectinate in ♂ are separable thus:—

♂ ♂.

- | | |
|--|-------------------------------|
| 1 (6). Elytra black or livid; antennæ strongly flabellate. | |
| 2 (3). Eyes very little larger in ♂ than in ♀; prothorax vittate or wholly black | <i>maindroni</i> , Bourg. |
| 3 (2). Eyes extremely large in ♂. | |
| 4 (5). Prothorax (except in var.) immaculate; lateral teeth very prominent | <i>pectinicornis</i> , sp. n. |
| 5 (4). Prothorax with a broad trifurcate patch on anterior half, lateral teeth less prominent. | <i>lividipennis</i> , sp. n. |
| 6 (1). Elytra metallic; eyes large; antennal rami shorter; prothorax with a small spot on disc | <i>pahnianus</i> , sp. n. |

MALTHINUS, Latr.

Malthinus stramineus, sp. n.

Elongate, narrow, shining, clothed with very fine short pubescence; pale testaceous, the wings hyaline, the eyes black, the antennæ more or less infusate in their outer half, the tips of the mandibles rufescent; obsoletely, minutely punctulate. Head very large, broad, much narrowed posteriorly; eyes large, convex; mandibles acutely toothed before the tip; maxillary palpi long, slender; antennæ very long, slender. Prothorax longer than broad, narrow, the disc depressed and bicarinate posteriorly. Elytra short, barely half the length of the abdomen.

♂. Penultimate ventral segment deeply arcuato-emarginate, the terminal one oblong-oval, covering the complex genital armature.

Length 4-5½ mm. (♂ ♀.)

Hab. S. INDIA, Kodaikanal and Neutral Saddle, Palni Hills, alt. 5000-7000 ft. (*S. Kemp*: viii. 1922: *type in Calcutta Museum*).

Sixteen examples. An immature-looking, pallid form, with a very large head, prominent eyes, slender antennæ, and short, obsolete punctulate elytra. The sexual differences are slight. The similarly-coloured *M. albidipennis*, Pic (1907), from Pegu, is described as having a short prothorax and long, narrow, irregularly punctured elytra. *M. lineatocollis*, from Almora, has punctato-striate elytra.

ICHTHYURUS, Westw.

Ichthyurus ranikhetensis, sp. n.

♂. Opaque, the head shining, finely pubescent; black, the antennal joints 1 and 2 testaceous, the head in front and sometimes on each side between the eyes above, the prothorax with the sides and base to a variable extent (leaving an anteriorly-dilated, broad median vitta, or an irregular M-shaped mark on the disc, black or piceous), the scutellum, the elytra with the basal margin or basal half, the apical margins of the abdominal segments, and the sides also of the basal ones, the bases of the intermediate and posterior tibiæ, a spot on the posterior coxæ, and sometimes the basal halves of the posterior femora, ochreous or pale flavous; the head densely, very finely, the rest of the surface rugulosely punctured, the puncturing of the broad basal portions of the elytra much coarser than that of the divergent narrow apical extension. Head slightly wider than the prothorax; eyes very large; antennæ slender, filiform, moderately long. Prothorax transverse, narrowed anteriorly. Terminal dorsal segment produced with two very long, conical, subparallel appendages; seventh ventral segment divided into two, rather long, concave, subtriangular, divergent plates (figs. C, 1, 2). Intermediate tibiæ distinctly curved.

Length 7-9 mm. (♂ ♀.)

Hab. Ranikhet Division of Kumaon (*H. G. C.*: vi. 1920).

Three males, varying in the extension of the ochreous coloration on the prothorax and elytra. An opaque insect not unlike the Burmese *I. costalis*, Westw., but much smaller.

Ichthyurus nigricauda, sp. n.

♂. Opaque, finely pubescent; head, palpi, antennæ (joints 1-8 excepted), prothorax (except along the basal margin), a streak at the tip of each elytron externally, the dorsal

abdominal segments 1-4 (except at the sides and base), the conical processes at the tip, the ventral segments 1-6 (except at the sides and base), and the pro-, meso-, and metasternum in great part, nigro-piceous or black, the tarsi and the outer halves of the tibiæ infusate, the rest of the body ochreous or testaceous; the entire surface densely, rugulose punctured. Head a little broader than the prothorax, slightly hollowed above, transversely subcarinate in front; eyes very large; antennæ slender, filiform, moderately long. Prothorax transversely subquadrate, obliquely narrowed anteriorly. Elytra about as long as the head and prothorax, divergent. Intermediate femora feebly incrassate, slightly curved. Terminal dorsal segment produced into two very long, conical, divergent processes; seventh ventral segment produced on each side into a curved, laterally-produced, triangular, convex plate, and also strongly, irregularly bidentate in the middle behind (fig. C, 3).

♀. Broader; elytra and dorsal surface of abdomen (the conical processes excepted) entirely ochreous; abdominal processes more widely separated (fig. C, 4).

Length 8-9 mm. (♂ ♀.)

Hab. Gokteik, near Maymyo, Burma (*H. L. Andrewes*: vi. 1910).

One pair. Near the Burmese *I. dilutus*, Gestro, the prothorax (the basal margin excepted) black, the dorsal abdominal segments 1-4 and the ventral segments 1-6 nigro-fasciate anteriorly in ♂; the head less concave above, the seventh ventral segment differently shaped, and the conical appendages more approximate, in this sex. *I. immaculatus*, Pic (1919), from Wallardi, S. India, is a larger insect, with an ochreous prothorax.

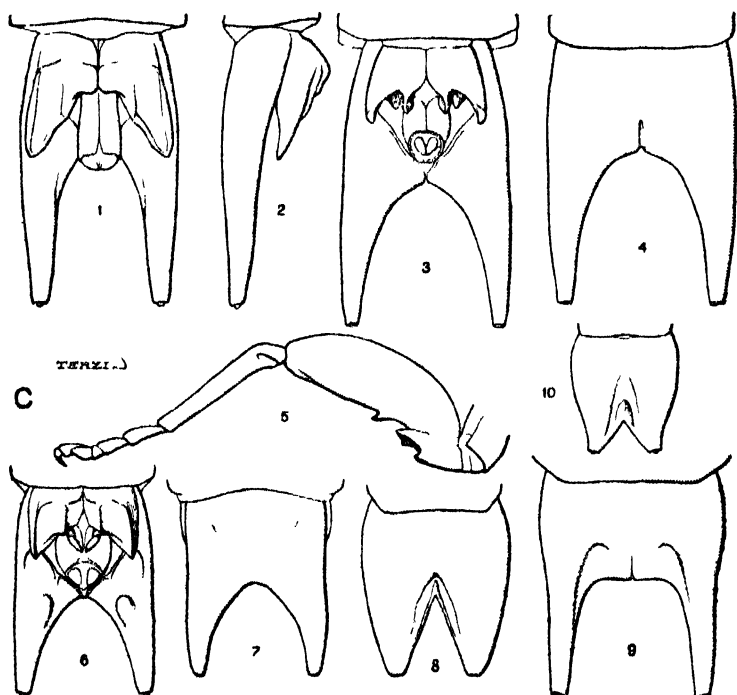
Ichthyurus tridens, sp. n.

Ichthyurus maculifrons, var., Champ. Ent. Monthly Mag. 1920, p. 248.

♂. Nigro-piceous or black, the basal joints of the antennæ testaceous, the head with a rather broad oblique stripe on each side between the eyes and the inter-ocular space in front, the basal margin of the elytra, the apical margins of the dorsal abdominal segments and the sides also of 1-3, the trochanters in part, the bases of the posterior femora, and the dilated inner portions of the posterior coxæ, whitish or pale flavous, the elytra with a large yellow apical spot. Intermediate trochanters produced into two teeth; intermediate femora (fig. C, 5) curved, compressed, strongly incrassate, armed at the base beneath with an oblique tooth similar to

those on the trochanter; intermediate tibiae compressed, a little broader and more rounded at the base externally than in ♀. Terminal dorsal segment produced into two long, moderately divergent, conical processes; seventh ventral segment divided into subtriangular plates (fig. C, 6).

Fig. C.



- 1, *Ichthyurus ranikhetensis*, sp. n., terminal ventral segments of ♂; 2, ditto, in profile. 3, *I. nigricauda*, sp. n., ♂, terminal ventral segments; 4, ditto, ♀, terminal dorsal segments. 5, *I. tridens*, sp. n., ♂, intermediate leg from beneath; 6, ditto, ♂, terminal ventral segments; 7, ditto, ♀, terminal dorsal segments. 8, *I. annulatus*, sp. n., ♂, terminal dorsal segments; 9, ditto, ♀. 10, *I. malhi-noides*, sp. n., ♂, terminal dorsal segments.

♀. Legs simple; abdomen broader, the conical processes a little shorter and less approximate (fig. C, 7).

Length 6-7 mm. (♂ ♀.)

Hab. Ranikhet Division of Kumaon (H. G. C. : vi. 1920).

A ♂ of this species has now been received, showing that the ♀ was incorrectly treated by me as a colour-variety of

I. maculifrons, numerous examples of the latter having also been obtained since 1920. The ♂-characters are peculiar, and amongst the large number of *Ichthyuri* named and figured by Gestro there does not seem to be one with similar intermediate femora.

Ichthyurus annulatus, sp. n.

♂. Opaque, the prothorax shining, finely pubescent; head at base, antennæ (joints 1 and 2 excepted), a transverse patch on the disc of the prothorax, a broad vitta on the outer portion of each elytron (extending from a little below the base to beyond the middle), the abdominal segments 1-6 (except at the sides and apex), the metasternum in great part, a space on each femur near the tip, tibiæ (except at base), and tarsi black or piceous, the rest of the body and legs testaceous or flavous; the surface densely rugulose, the prothorax smoother. Head broader than the prothorax; eyes very large; antennæ moderately long, slender, filiform. Prothorax transversely subquadrate. Elytra divergent from about the middle. Intermediate femora as in ♀. Terminal dorsal segment rounded at sides, produced into two triangular processes, which are contiguous at the base within (fig. C, 8); seventh ventral segment simple.

♀. Broader, the black basal portion of the head tridentate anteriorly; the antennæ darker at the base; the prothorax with a small transverse mark in the centre in front and the discoidal patch extending outwards to the lateral margins; the elytral vitta longer and extending narrowly along the outer margin to the tip; the terminal dorsal segment much longer and broader, and produced into two long, widely-separated, parallel, conical processes (fig. C, 9).

Length 8-10 mm. (♂ ♀.)

Hab. Gopaldhara, Rungbong Valley, Sikkim (*H. Stevens*).

Two specimens, almost certainly the sexes of the same species, the great difference in the shape of the forcipiform processes of the abdomen notwithstanding. Larger and more robust than *I. himalaicus*, Champ. (1920), the head densely rugulose and opaque, the femora annulate, the elytra with a broader vitta, the terminal abdominal processes very differently shaped in both sexes. *I. gianellii* and *I. abnormis*, Gestro, both from Darjeeling, must be very different insects.

Ichthyurus malthiniiformis, sp. n.

Slender, shining, finely pubescent; piceous, the antennæ (the partly testaceous joints 1 and 2 excepted) black, the prothorax (a broad, cruciform, elongate, posteriorly-cleft, fuscous patch on the disc excepted), and the ventral segments

1-6 in great part, stramineous, the elytra with a large apical patch (extending forwards laterally) yellow, the legs testaceous, the tibiae and tarsi in great part infusate; the surface closely punctulate. Head about as wide as the prothorax, flattened above; antennae moderately long, filiform. Prothorax subquadrate, a little broader than long. Elytra feebly dehiscent. Terminal dorsal segment convex, subcordate, divided at the apex into two short, broad, slightly divergent, triangular processes (fig. C, 10); seventh ventral segment entire. Femora simple.

Length 6 mm. (♂ ?)

Hab. Pindar Valley, Almora, between 8000 and 11,000 ft. (*H. G. C.* : vii. 1920).

One specimen, apparently ♂. A small, slender form, with the general facies of a *Malthinus*. Allied species inhabit the Nilgiris and Ceylon, such as *I. piscicollis*, Gestro, &c. The cruciform dark patch on the prothorax and the feebly-dehiscent elytra are characteristic.

ATTALUS, Er.

Attalus palniensis, sp. n.

Moderately elongate, widened posteriorly, shining, clothed with fine, adpressed, brownish or cinereous pubescence intermixed on the head and elytra with numerous long erect bristly hairs; brassy-black, the antennal joints 1-3 in part, mandibles, clypeus, base of prothorax on each side, a streak extending down each elytron near the suture, which is usually connected with a spot at the tip (the latter extending forward for some distance along the outer margin), tibiae, and bases of tarsi, flavous or testaceous; the head and prothorax minutely, the elytra densely, subrugulose, punctulate, the setae on the latter arising from shallow depressions or transverse rugae. Head bi-impressed, a little narrower than the prothorax, the latter transverse; antennae rather slender, subserrate. Elytra simple, at the base broader than the prothorax, widening to near the apex, the latter rounded. Posterior tibiae curved.

♂. Anterior tarsal joint 2 extending over 3 above, nigropectinate at tip; antennae a little longer than in ♀.

Var. The prothorax wholly infusate; the elytral vitta obsolete, the apical patch only flavous or testaceous. (♂ ♀.)

Length $3\frac{1}{2}$ - $4\frac{1}{2}$ mm. (♂ ♀.)

Hab. S. INDIA, Marian Shola, Vandaravu, Kavungi, and Kodaikanal, Palni Hills, alt. 6700-7400 ft. (*S. Kemp*: vii., viii. 1922: type in *Calcutta Museum*).

A long series, varying in the development of the yellow

markings on the elytra and at the base of the prothorax, the vitta on the elytra usually connected with the apical spot and sometimes quite broad in the female. The dark variety is represented by three examples. Near *A. apicipennis*, Pic (1914), "Indes," which is described as having a testaceous prothorax, nigro-subcynaceous elytra, and the apex narrowly flavous.

Attalus sejunctus, sp. n.

Very like *A. palniensis*, differing as follows:—bronze- or bluish-black; the elytra of ♀ with the base, a narrow sutural streak extending thence to near the tip, and the outer half for the same distance, black, and the rest of their surface yellow, those of ♂ with an apical spot only of that colour; the legs entirely black in both sexes; the erect setæ shorter and less numerous.

Length 3–3½ mm.

Hab. S. INDIA, Pumburai and Kubbab, Palni Hills, alt. 6500–7200 ft. (*S. Kemp*: viii., ix. 1922: type in *Calcutta Museum*).

Three ♂♂, two ♀♀, the sexes differing greatly in the colour of the elytra, but showing no variation, the legs in both wholly black. The ♂ resembles the dark variety of *A. palniensis*; the ♀ has the yellow coloration more extended than in any of the specimens of the same sex of that insect obtained by Mr. Kemp. Whether all these specimens from the same region should be treated as forms of one species is perhaps a matter of opinion; in any case, the black-legged form requires a distinctive name.

HYPEBÆUS, Kies.

Hypebæus nainiensis, Champ.

Hypebæus nainiensis, Champ. Ent. Monthly Mag. 1922, p. 267 (♀).

♂. Anterior half of head whitish; antennæ slender, a little longer than in ♀, usually infuscate in their outer half; elytra with the large subapical black patch reduced to an angulate, curved, fascia on each of them, the subapical pallid space (a common triangular sutural patch excepted) whitish in fresh examples, the apices narrowly transversely excavate, and the sutural angles produced into a triangular black plate, which appears vertical when viewed in profile; legs testaceous, the posterior tibiæ usually in part black, their apices not produced.

Hab. Nainital, U.P., alt. 7000–8600 ft. (*H. G. C.*: vii. 1923).

Numerous males of this species have now been received, the sexes differing in the elytral maculation as in several

other Indian *Hypebæi* described by myself. The reduced size and altered shape of the subapical patch in the ♂ is, of course, due to the structure of the apical portion of the elytra in this sex.

ASPIDIPHORUS, Ziegler.

Aspidiphorus asiaticus, sp. n.

Short-oval, rather broad, convex, shining, thickly pubescent; piceous, the scutellum and elytra reddish brown, the antennæ and legs testaceous; the head, prothorax, and scutellum closely, very finely punctured, the elytra with closely punctured deep striæ, the interstices somewhat convex and very sparsely punctulate. Antennæ with the basal joint and club less thickened than in *A. orbiculatus*, Gyll., the club thus appearing more elongate, joint 8 a little longer than 10, 9 about as long as broad. Legs slender.

Length $1\frac{1}{4}$ mm.

Hab. Nainital, between 7000 and 8000 ft. (*H. G. C.*: vii. 1923).

One example, in perfect condition. An Asiatic form of the European *A. orbiculatus*, Gyll., and *A. lareyniei*, Duv., differing from both of them in the deeply striate elytra, the more slender legs, and the narrower antennal club. *A. 4-guttatus*, Weise, from Sikkim, described in 1895 (*Deutsche ent. Zeitschr.* p. 326) in a paper on the Coccinellidæ of Madagascar, is a larger (length 3 mm.), maculate insect. The somewhat nearly allied genus *Sphindus* was recorded by me from India in 1922 (*Ent. Mo. Mag.* lviii. p. 74). *Aspidiphorus* is also represented in the Seychelles and Tasmania.

TETRATOMA, F.

Tetratoma cyanoptera, sp. n.

Elongate, convex, a little widened posteriorly, shining; head æneous, the prothorax testaceous, with a golden-green lustre, the elytra brilliant cyaneous, the antennæ, scutellum, legs, and under surface (the partly testaceous abdomen excepted) nigro-piceous or black; the upper surface rather sparsely punctured, the puncturing of the elytra coarse, that of the other portions finer. Antennæ long, reaching far beyond the base of the elytra, joint 1 stout, 4-7 small, short, closely articulated, 7 much broader than 6, 8-11 perfoliate, very stout, 8 cylindrical, longer than broad, 9 and 10 shorter, about as long as broad, 11 oval, longer than 10. Prothorax transverse, sharply margined, arcuately narrowed

from the base forward, the margins notched at about the middle and subcrenulate, the basal foveæ oblique and connected along the margin. Elytra long, at the base a little broader than the prothorax, widening to near the apex, conjointly rounded and somewhat produced at the tip.

Length $4\frac{1}{2}$ mm. (σ ?)

Hab. Sikkim, Tonglo (*H. Stevens* : vi. 1920).

One specimen, recently brought to London by Mr. Stevens amongst a mass of Phytophaga, for a species of which it might easily be mistaken till the antennæ and tarsi were examined. *T. cyanoptera* also has the general facies of a *Triplax*, fam. Erotylidæ. It differs from the European *T. fungorum*, F., in the very shining upper surface, the dark blue, less parallel elytra, narrower and smoother prothorax, and black legs and antennæ, the latter with joints 8-10 much longer.

SPHÆRIESTES, Steph.

Sphæriestes nigrocyanus, sp. n.

Moderately elongate, very shining, glabrous; nigrocyanous, the head and prothorax æneous in one specimen, the under surface brassy-black, the palpi, basal joints of antennæ, and tibiæ and tarsi in part, testaceous, the rest of the antennæ and legs black. Head short, closely punctured, very slightly narrowed anteriorly, the lateral carina oblique, almost straight, deeply bi-impressed in front, the anterior margin thickened; eyes small, prominent; antennal joints 8-11 thickened, 7 a little stouter than 6. Prothorax a little wider than the head, about as long as broad, convex, cordate, constricted and much narrowed posteriorly; closely, rather coarsely punctured, transversely excavate on each side anteriorly and in the smaller example at the base also. Elytra transversely excavate on the disc below the base, rather coarsely, regularly striato-punctate. Beneath sparsely, finely, the sides of the metasternum coarsely, punctured. Anterior tarsal joints 1-3 slightly widened.

Length 2-3 mm.

Hab. Nainital, alt. between 7000 and 8000 ft. (*H. G. C.* : vii. 1923).

Two examples, differing greatly in size, the larger one apparently a σ . A brilliantly metallic form allied to the European *S. aratus*, Muls., the antennæ with the four apical joints only dilated, the head short, and so deeply impressed in front as to appear to have the anterior margin raised. This insect probably lives beneath the bark of deciduous trees, like *S. mutilatus*, Beck.

XXXVIII.—*New Data concerning Styringomyia (Diptera, Tipulidæ)*. By F. W. EDWARDS.

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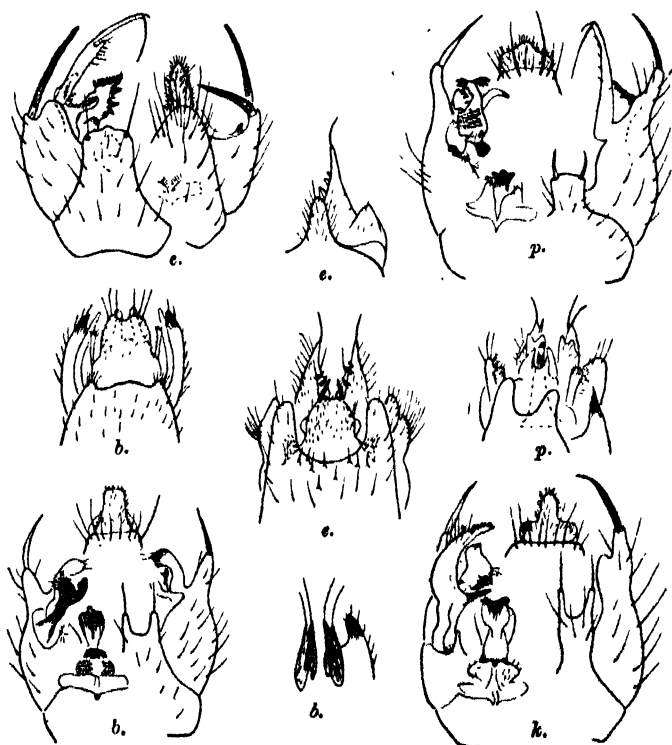
SINCE the publication of the writer's revision of the genus *Styringomyia* (Trans. Ent. Soc. London, 1914, pp. 206–227, pls. xix.–xxv.) a good deal of additional material of this interesting genus has been received at the British Museum, and opportunities have also occurred to examine still other specimens belonging to other museums. A number of new species which were represented in the material examined are described here; descriptions of four or five others will shortly appear elsewhere.

Although our knowledge of the early stages of the genus is still very incomplete, an important step forward has been made by Dr. A. Ingram, who has reared three species on the Gold Coast. The pupa of one of these species is described in this paper, and, though it does not greatly help us towards elucidating the relationships of the genus, it may be remarked that it shows some characters in common with *Teucholabis*.

There is one important point in which my previous account of the adult morphology was at fault. A careful examination of the male hypopygium shows that we have in *Styringomyia* one of those cases in which the whole of this organ undergoes a torsion of 180° after emergence from the pupa. The torsion is invariably complete and permanent in every species of the genus; I have been able to confirm it by dissecting the single male pupa of *S. ingrami* preserved by Dr. Ingram, in which I found the parts to occupy the reverse position from what one sees in the adults. In my description of the hypopygium, therefore, the names "ninth tergite" and "ninth sternite" should have their application transposed; the part which I regarded as possibly the tenth sternite is really the tenth tergite or anal segment. The occurrence of this torsion is rare in the Tipulidæ, occurring only, so far as I am aware, in the genera *Molophilus* and *Amphineurus*, and in an incomplete form in *Macromastix*.

The arrangement of the bristles of the thorax seems to be remarkably constant throughout the genus; there is, however, some variation in the different species in the number of bristles on the anterior division of the pronotum, and in the number and arrangement of the fine bristles in the middle of the mesonotal præscutum. These latter may be

divided into two groups: a *humeral* set, consisting of a pair of short transverse rows or patches in the foveal region, and a *discal* set, forming longitudinal rows along the præscutal interspaces. Apart from these minor variations, there is a great difference in the length and size of certain bristles,



Genitalia of *Styringomyia*.

- e.*, *S. ensifera*, sp. n.: hypopygium from above and below, tip of ovipositor from above, and the whole organ from below. *p.*, *S. papuana*, sp. n.: hypopygium from below (ninth tergite and anal segment removed and shown separately) and from above, ovipositor from below. *b.*, *S. biroii*, sp. n.: the same, also tip of ovipositor from above. *k.*, *S. kerteszi*, sp. n.: hypopygium from below and above (ninth tergite and anal segment removed and shown separately).

particularly the four main bristles of the acutum. In a small group of species, two of which are described below, these and certain other bristles are remarkably flattened and blade-like.

1. ETHIOPIAN SPECIES.

Styringomyia ingrami, sp. n.

Head blackish, bristles black. *Palpi* deep black. *Antennæ* with the first, third, and fourth segments dark brown, remainder blackish. *Thorax* black, the præscutum with shimmering greyish markings, varying with the light. *Chætotaxy* normal; the four main scutal bristles all long and conspicuous, but not flattened. *Abdomen* entirely black, somewhat shining. *Hypopygium* with the true ninth sternite with a long slender terminal portion, which is only slightly indented at the tip; side-piece with only one slender terminal spine, borne on a very short projection; upper clasper long, straight, black, terminal in position, and with a row of short bristles on its inner margin, some of which towards the base are very short and spiny; tenth tergite broadly triangular, without chitinised side-portions. *Ovipositor* with the seventh sternite very little narrowed apically, its lateral angles produced into short but distinct knobs. *Legs* black; *tibiae* narrowly and indistinctly brownish at the base; front tarsi with the tip of the first segment just perceptibly lighter, segments 2-4 yellowish with the tips narrowly darkened; mid-tarsi with the basal third of the first segment obscurely whitish, segments 2 and 3 obscurely yellowish except towards the tips; hind tarsi with the first four segments rather bright yellow. *Wings* brownish-tinged, with the usual dark spots rather ill-defined; the spot over *r-m* rather large, but not reaching the costa. All the veins dark; cell *M*₁ just sessile; *Ax* curved downwards at the tip. *Halteres* black, tip of knob somewhat lighter.

GOLD COAST: Aburi, 18.vi.1920, bred from rotting banana-fibre (*Dr. A. Ingram*). One female bred; male dissected from pupa. Presented to the British Museum by the Imperial Bureau of Entomology.

Closely related to *S. leucopexa*, Edw. (Nyasaland), differing chiefly in details of genital structure, notably the comparatively slight emargination of the tip of the ninth sternite and the very much more slender spine of the side-piece of the male, and in the produced corners of the seventh sternite of the female. Further, the antennal flagellum in *S. leucopexa* is pale, and the dark spot over *r-m* is much larger.

The pupa shows some very interesting features, and may be briefly described as follows: Head with four small rounded tubercles on the face; front with a pair of large

conical tubercles, each bearing a short, stout, terminal seta. Prothoracic breathing-horns very short, somewhat flattened, and widened apically, with a terminal row of minute apertures. Behind the breathing-horns on the præscutum are four large, bluntly rounded tubercles, the inner pair larger than the outer, and all finely papillose. Behind these again are four minute tubercles, placed more widely apart, and each bearing a short seta. Wing-sheaths reaching nearly to the end of the second abdominal segment, leg-sheaths to just beyond the end of the third; ends of tarsal sheaths almost level, the middle pair only very slightly shorter. Tergites and sternites of first seven abdominal segments each with a row of about twenty minute, close-set, minutely spinose tubercles near the posterior margin; pleurites with only two or three similar but somewhat larger tubercles. Eighth segment without obvious spiracles; with a pair of widely separated conical dorsal tubercles, and another pair of more pointed lateral tubercles, these being somewhat bifid. Ninth segment with two pairs of dorsal projections, the first smaller and bluntly conical, the second larger, more pointed, and hook-like; also a small pair of ventral tubercles. The eighth and ninth segments are much alike in the two sexes, except that the male has the genital sheaths more prominent. The whole pupal integument is uniformly chitinated.

The larvæ unfortunately were not preserved.

Styringomyia obscuricincta, sp. n.

♀. Differs from *S. ingrami* as follows:—Præscutum with more definite greyish stripes; a broad median one running the whole length, and a short lateral pair. Scutellum more extensively greyish. Lateral processes of seventh sternite rather long and slender. Tip of first front tarsal segment a deeper black than the rest of the segment, the next three segments with broader black tips. First mid-tarsal segment with only the tip black. Hind femora with an obscure yellowish ring beyond the middle. Dark spot over *r-m* smaller.

GOLD COAST: Nsawam, 24. vii. 1920, bred from rotting banana-fibre (*Dr. A. Ingram*). Type and one other female presented to the British Museum by the Imperial Bureau of Entomology.

Styringomyia crassicosta, Speiser.

Additional locality:—GOLD COAST: Nsawam, 24. vii. 1920

(Dr. A. Ingram); 3 ♂, 1 ♀, reared from fallen and rotting palm-tree. Obuasi (Dr. W. M. Graham); 1 ♂ in Cambridge Museum.

Styringomyia annulipes, End.

PORTUGUESE E. AFRICA: On boat by bank of Zambesi river, 21. vi. 1914, "mimicking spider" (R. C. Wood); 1 ♂, 1 ♀.

These specimens agree well with the Seychelles specimens of the species.

Styringomyia annulipes, var. *occidentalis*, nov.

♂. Differs from typical *S. annulipes* as follows:—General coloration rather darker and duller; rings of femora broader and darker; branches of media and cubitus entirely dark, though not dark-margined. Discal bristles of praescutum stouter, the first four or five placed closer together in a definite row. Terminal projection of side-pieces of hypopygium much more definite, with a much stouter and almost spine-like terminal bristle; structure of hypopygium otherwise identical with that of the typical form.

GOLD COAST: Accra, viii. 1916, in bungalow (Dr. J. W. S. Macfie). Type, ♂, in the British Museum, presented by the Imperial Bureau of Entomology.

Styringomyia vittata, Edw.

Additional localities:—NYASALAND: Zomba, 29. vii. 1913 (E. Ballard); 1 ♀. NATAL: Durban (F. Muir and E. C. Chubb); 8 ♂, 3 ♀. CAPE: Worcester, 27–30. iii. 1921 (R. E. Turner); 1 ♂.

The dark abdominal stripe is sometimes only indicated on the last two or three segments.

Styringomyia nigripalpis, Edw.

Additional localities:—GOLD COAST: Accra and Kumasi (Mrs. W. Smith); 2 ♂, 1 ♀.

Styringomyia impunctata, Edw.

Additional locality:—DELAGOA BAY: On board ship at quay side, Lourenco Marques, 25. iv. 1920 (Dr. W. C. C. Pakes); 1 ♀.

2. ORIENTAL AND AUSTRALASIAN SPECIES.

Styringomyia himalayana, Edw.

ASSAM : above Tura, Garo Hills, 3500–3900 ft., vii. 1917 (*S. Kemp*) ; 1 ♂, 1 ♀.

The specimens are mounted *in copula*, and it is interesting to note that the membranous anal segment of the male fits into the notch in the seventh sternite of the female ; the spine of the male side-piece reaches just to the base of the eighth tergite of the female ; and the complicated lower claspers of the male are apparently inserted into the anal segment of the female.

In this species, as in some others which are nearly allied, the scutal bristles are all short and inconspicuous.

Styringomyia ceylonica, Edw.

Additional localities :—NEW GUINEA : Friedrich-Wilhelmshafen, and Seleu, Berlinhafen (*Biró*, 1896 and 1901) ; 1 ♂, 2 ♀, in Budapest Museum.

Styringomyia fryeri, Edw.

Additional locality :—CEYLON : Yatiyamtota, ix. 1911 (*E. E. Green*) ; 1 ♂, 1 ♀, in British Museum.

Styringomyia didyma, Grimshaw.

Additional localities :—NEW GUINEA : Friedrich-Wilhelmshafen, and Seleu, Berlinhafen (*Biró*, 1896 and 1901) ; 14 ♂, 8 ♀, in Budapest Museum. SAMOA (*Dr. F. W. O'Connor*, 1921) ; 2 ♂, in British Museum.

The specimens agree closely with the type from Hawaii.

My figures of the hypopygium of this species are not very good. The terminal spine of the side-pieces is usually directed straight backwards, as in the allied species, but is peculiar in having a long hair-like termination. The gently curved and scarcely darkened tip of *Ax* and the thoracic and abdominal markings seem to be constant. In most specimens the palpi are blackish, in rather striking contrast to the pale yellow colour of the body.

Styringomyia biroi, sp. n.

Head ochreous, with two rather large confluent brown spots on the nape. Main bristles black, normal in size ; between the anterior frontals is a pair of pale ones, larger in the ♂ than in the ♀. Antennae with the first segment pale

above, dark below (in one ♂ all dark), second segment dark, flagellum pale, intermediate segments in ♂ somewhat elongate. Palpi ochreous, tips of second and third segments darkened. *Thorax* mostly ochreous. Sides of pronotum darkened. Anterior prominence of præscutum dark brown, with a narrow median pale line; a pair of rather broad but ill-defined dark brown lines extend along the inner sides of the rows of discal bristles, then turn outwards and pass along the outer margins of the scutum and scutellum. Bristles all black, normal in size; anterior pronotal 2-3; humeral absent; discal 3+1 (♂) or 6-7 (♀). *Abdomen* ochreous, tergites narrowly dark-margined posteriorly, the dark colour in one ♂ narrowly interrupted in the middle. Hypopygium: Ninth sternite deeply emarginate apically, with a pair of rather strong terminal hairs. Tenth tergite square-ended, not definitely trilobed. Side-pieces with one rather short and not very strong terminal spine. Upper claspers much reduced. Lower claspers not remarkably modified. Ovipositor: Seventh sternite with the apical corners very slightly produced; anal parts comprising four black appendages. *Legs* with the dark rings rather narrow, normal in position. *Wings* with normal venation and the usual black clouds. Cell M_1 just sessile. *Ax* with long macrotrichia at its base only, tip sharply curved but without angle or spur. Tips of all the veins slightly, and of *Ax* rather conspicuously, darkened. Halteres ochreous. Wing-length 4-5 mm.

NEW GUINEA: Simbang, Huon Golf (Biró, 1898), 1 ♂ (type in the Budapest Museum); Friedrich-Wilhelmshafen (Biró, vi. 1896 and 1901), 1 ♂, 1 ♀ (paratypes).

This species is nearly allied to *S. bancrofti*, Edw., from Queensland, differing principally in the structure of the lower claspers and the aedeagus of the male.

Styringomyia kerteszi, sp. n.

Closely allied to *S. birói* and *S. bancrofti*, differing in the details of the hypopygial structure (fig. k), particularly in the form of the tenth tergite and the remarkable development of the lower claspers.

NEW GUINEA: Friedrich-Wilhelmshafen (Biró, vi. 1896); 1 ♂. Type in the Budapest Museum.

Styringomyia papuana, sp. n.

Head light ochreous (1 ♂) or dark greyish brown (1 ♂, 1 ♀), without markings. First antennal segment light above (1 ♂) or all dark (1 ♂, 1 ♀); second dark; flagellum pale.

Palpi blackish, bases of segments ochreous. Bristles normal. *Thorax* whitish grey dorsally; sides of pronotum dark brown; anterior prominence and four confluent anterior spots on præscutum dark brown; lateral and posterior margins of the scutum and the whole scutellum and post-notum dark. Pleura ochreous. Bristles all black, normal; humeral absent; discal 6-9; mid-scutal much shorter than lateral scutal. *Abdomen* pale ochreous, the tergites with narrow dark apical bands, interrupted in the middle. Hypopygium: Ninth sternite square-ended, not darkened apically, with a pair of strong, widely separated, terminal bristles. Tenth tergite short and broad, slightly trilobed. Side-pieces with one moderately long and strong terminal spine. Upper claspers well developed, with the usual long and short terminal hairs. Ovipositor: seventh sternite somewhat narrowed and greatly emarginate apically; anal parts not blackened. *Legs* ochreous, with the usual narrow dark rings, the outer ring on the front and hind femora incomplete. *Wings* with normal venation and the usual black clouds. Cell M_1 rather broadly sessile. *Ax* angulated or spurred, with preapical blackening. Tips of veins not distinctly darkened. Halteres ochreous. Wing-length 4-4.5 mm.

NEW GUINEA: Seleu, Berlinhafen (*Biró*, 1896); 1 ♂, 1 ♀ (types in the Budapest Museum). Friedrich-Wilhelmshafen (*Biró*, 1901); 1 ♂.

Apparently most nearly allied to *S. javana*, Edw., in hypopygial structure, but quite distinct in its thoracic markings.

Styringomyia bipunctata, sp. n.

♂. *Head* ochreous, also the whole antennæ; palpi darker; bristles finer than usual. *Thorax* ochreous, lower part of pleura rather lighter. Mesonotum unmarked, except for a small round blackish spot at the outer anterior corner of each scutal lobe. Bristles all slender; no discals. Post-notum dark above. *Abdomen* with tergite 1 black, 2 ochreous in middle, black at base and tip, 3 with a pair of black spots near base and black band at tip, 4-7 each with complete blackish bands near base and at tip. Hypopygium: Ninth tergite rather short, ending in three little triangular points. Ninth sternite very long, extending beyond the tips of the side-pieces, curled into a tubular shape, truncate and slightly blackened at the tip. Terminal projection of side-pieces rather long and stout, with one rather weak spine and a number of stiff hairs, two or three of which are thickened, black, and almost spine-like. *Legs* uniformly yellow, except

for the extreme tips of the femora and tibiae. *Wings* faintly yellowish-tinged, with the usual dark spots over the cross-veins. Cell M_1 rather broadly sessile. *Ax* rather long and running straight to the hind margin. Halteres ochreous. Wing-length about 5 mm.

QUEENSLAND: Malanda (*Mjöberg*); type ♂ in the Stockholm Museum.

Determined by Riedel as "*Styrgomyia* spec. unausgefärbt." Differs from all the other recent species, but resembles the fossil *S. venusta*, Lw., in the long and straight vein *Ax*.

Styrgomyia ensifera, sp. n.

A very distinct species on account of the remarkable development of some of the bristles of the head and thorax.

Head dark brownish, rather heavily dusted with grey. First antennal segment almost all dark brown, second more or less darked above, flagellum ochreous, the intermediate segments rather elongate, cylindrical, last two or three shorter. Palpi with the first three segments blackish, 2 and 3 lighter at the base, 4 entirely pale yellow. The four frontal bristles long, stout, flattened, and black, vertical bristles slender, shorter than the frontal, and golden. *Thorax* almost uniformly ochreous, sometimes a trace of a pair of dark spots surrounding the humeral bristles; pronotum dark brown at the sides posteriorly. Chaetotaxy: anterior pronotal 1 or 2, long, black, slightly flattened; posterior pronotal 2, outer small and golden, inner long, black, flattened; humeral 3-5; discal 3+1, rather long, black; pre-alar 2, anterior small and golden, posterior very long, flattened, black, backwardly directed; sutural short, slender, black; lateral and mid-scutal very long, black, sword-shaped, forwardly directed; posterior scutal very small and short; scutellar long, black, somewhat flattened, but much less so than the scutal. *Abdomen* ochreous, tergites with the posterior borders dark brown, the dark colour more or less interrupted medially. Hypopygium (fig. e): ninth sternite broad at tip, not emarginate, with a pair of stout, widely separated, terminal hairs. Tenth tergite rather long and pointed. Side-pieces with two long and stout apical spines, the lower one the stouter and inwardly directed. Upper clasper with a median projection bearing a row of hairs. Ovipositor (fig. e): ninth tergite with a median finger-like hairy projection; seventh sternite deeply emarginate apically. *Legs* ochreous, with narrow dark rings in the usual positions. *Wings* faintly tinged with yellowish, with the usual black

clouds over $r-m$, Cu_1a and the apex of the discal cell; tips of all the veins also distinctly darkened, that of Ax conspicuously so. Cell M_1 rather broadly sessile. Ax strongly curved at the tip, but without angle or stump, long macrotrichia at its base, shorter ones extending to beyond the middle. Halteres ochreous. Wing-length 4–5 mm.

NEW GUINEA: Friedrich-Wilhelmshafen (Biró, 1901); 1 ♂, 2 ♀. Type in the Budapest Museum; paratypes of this and the other species described here in the British Museum.

Styrgomyia armata, sp. n.

Closely allied to *S. ensifera*, differing as follows: Head rather lighter in colour, but antennal flagellum darker; palpi black, segment 4 ochreous except at the base. Anterior vertical bristle long and black, slightly flattened, but less so than the four frontal. Pronotal bristles: anterior 3–4, the outermost distinctly flattened; posterior 2, both black. Hypopygium: ninth sternite not so broad apically, tip rounded, terminal hairs close together, subterminal hairs much stronger than the terminal; upper clasper without median projection. Dark rings on legs rather broader and more conspicuous. Wing-veins all somewhat darkened, but the tips not conspicuously so (except that of Ax). Cell M_1 shortly but distinctly stalked. Wing-length 6 mm.

PHILIPPINE Is.: Momungan, Mindanao, by table-lamp in house, 4.v. 1920 (Dr. Alfred Moore). Type ♂ in the British Museum, presented by the collector.

XXXIX.—On some Points in the Structure of the Venous System and the Blood-Glands of the Neck in the Cachalot (*Physeter macrocephalus*). By FRANK E. BEDDARD, D.Sc., M.A., F.R.S.

IN continuation of a previous contribution to these *Annals** I desire here to give some further facts in the anatomy of a foetal Sperm-Whale. The present notes relate to the same specimen, the source of which is acknowledged in my earlier paper.

§ The Chief Veins and their Branches.

Very little appears to be known about the vacuolar system of this whale, even in the adult state. And, so far as I am

* "On the Blow-holes and Nasal Passages of the Cachalot (*Physeter macrocephalus*)," *Ann. & Mag. Nat. Hist.* (9) xl. p. 641, June 1923.

aware, there is absolutely nothing known as to the foetal conditions. The only quite recent memoir known to me about the vascular system in any foetal whale is the account given by Schulte* of *Balænoptera borealis*, and the observations contained in a few papers referred to by him. The facts, so far as they can be learnt by a study of the heart, are dealt with in their memoirs by Pouchet and Beauregard† and by de Sanctis‡. I can confirm these authors as to the existence of only a *single* (right) *precaval* vein, which enters the right auricle by a much narrower orifice than that which admits the *postcaval*. No *azygos* vein was recognisable in my sections opening into the *precaval*; and it is the general opinion that this vein is not to be met with among the Cetacea. It is held by Schulte, in the memoir cited below, that the need for this vein in its upper region is met by a deep connection of veins draining the neighbourhood with the *precaval* system.

It is a curious fact that O. Müller, in a paper dealing with the organs of respiration in the Cetacea and some other aquatic mammals§, speaks of the “fälschlich sogenannten Vena Azygos,” but, nevertheless, figures a vein lettered “V.Az.” in *Phocæna* and *Hyperoodon*||. This vein he described as lying within the neural canal and leaving it between ribs 2, 3, and 4 (in *Phocæna*). No relationship to the *precaval* is, however, represented. In any case, *Physeter* seems to be quite without a persistent cardinal vein which could be identified with the adult *azygos* of other mammals.

The *postcaval* not long before its entry into the right auricle receives a branch, which would seem to be the phrenic¶. But this vein is at least chiefly concerned with the blood-flow from the thoracic rete. This is the only vein which I could discover in front of the two hepatics. The latter are equisized, and each is of the same size as the *postcaval* into which it opens. They plunge at once into the liver-tissue; but the *postcaval*, at first imbedded in the liver, soon emerges. Crossing the line of the body it comes

* “Anatomy of a Foetus of *Balænoptera borealis*,” Mem. Am. Mus. Nat. Hist. (n. s.), i. pt. vi. p. 465.

† Nouv. Arch. Mus. (3) iv. 1892.

‡ Atti Acc. Roma, ix. 1881.

§ Jen. Zeitschr. 1898, Bd. 32, p. 95.

|| Loc. cit. Taf. iii. figs. 3, 12.

¶ But, in view of the opening of the phrenic into the renal vein in *Balænoptera*, I cannot lay too much stress upon this identification. It is possibly a vein peculiar to the rete—a “tap,” that is to say, opening into the nearest big vein.

to lie exactly over the aorta as in various Marsupials and some other mammals, and does not lie to one side as is more commonly the case in Mammals.

In this there is agreement with the same vein in *Balænoptera* as shown by Daudt *, though not by Schulte. But the species of *Balænoptera* were not the same. In another important point the postcaval of *Physeter* agrees with that of *Balænoptera*. That is the double postcaval in the kidney-region. Shortly after the inflow of the renal vein into the postcaval the latter becomes double. In the transverse sections the fission of the vein—or, rather, the junction, as we may suppose, of two post-cardinals—is seen anteriorly in the shape of a slight outgrowth of the lower wall into the lumen of the vein. Gradually fission is accomplished, and there is a gradual parting of the two veins. They slowly get further away from each other and form the iliacs. As in the porqual, the renal veins are given off to the kidneys early in the latter glands, the much larger half of each kidney lying behind the entry of the renal vein. Moreover—as is so very usual,—the veins are not symmetrical with each other, but not so greatly so in *Physeter* as in *Balænoptera*.

A final point of interest in the postcaval which I have to record is that the two postcaval trunks communicate with each other round the aorta by a close series of connections, which brings about the result that the aorta is almost contained within the vein. This feature also characterises *Balænoptera borealis*, though it is also to be found, as Schulte points out, in *Ornithorhynchus*; and we cannot ignore the likeness, coupled with those shown in other features of the postcava of *Physeter* and *Balænoptera*, as evidence against the diphyletic origin of the toothed and whalebone whales.

The only other large vein which I have up to the present studied in this foetus is the umbilical, which has not been, so far as I can find out, seen, or at least described, in this Cetacean. The vein was cut or torn away posteriorly in dislodging the foetus from the mother. The remains that were left intact within the umbilical mesentery and were supported by that membrane fell some way short of the umbilicus, and lay, of course, between the two lobes of the liver, which is much prolonged posteriorly and almost protrudes from the umbilicus. The vein is conspicuous, owing to its rather thick walls. Without giving details for the

* Jen. Zeitschr. 1898, Bd. 52.

present of the branching of this vein, which will be more profitably given in connection with the liver itself, I note that anteriorly the umbilical vein divides into two equisized vessels, and that each of these becomes continuous with one of the two hepatic veins already referred to as uniting still more anteriorly with the postcaval. There is therefore a continuous connection, not as yet affected by the portal system, between the umbilical vein and the postcaval, which corresponds, as I presume, to the ductus venosus, and may indeed be an indication of the original existence of two umbilical veins.

§ Ductless Glands of the Neck.

I find in this fœtus that all the three types of ductless glands found in the neck-region of other Mammals are to be found—viz., thyroid, thymus, and epithelial glands. Of these, however, so far as I can ascertain, nothing is known in the adult whale. And, for the matter of that, very little is known about these glands in other whales; but they are described in the Pigmy Sperm-Whale*.

Such information as I have to give here is entirely microscopical, and therefore supplements what is known of the naked-eye characters of these glands in *Euphysetes* and *Balænoptera*† and in other Mammals to which I have to refer in setting forth these notes. I am therefore also able to be certain about the minute anatomy of the several glands and to refer them accurately to their category.

The *thyroid* consists of a median piece and of a lateral region, as in the case of all Mammals. But in this whale the lateral thyroid consists of only the left-hand region—that belonging to the right side is completely absent and not the slightest trace of it is to be seen in the sections. It cannot be doubted, I think, that the piece of tissue on the left side of the windpipe, and running not far from its lateral and ventral walls, is the equivalent of the lateral thyroid of other whales and mammals. Its relative position to the windpipe and to the median part of the thyroid is too similar to permit of another explanation.

This remarkable asymmetry evidently suggests a comparison with the asymmetry of the head of the whale itself, the connection of these and other ductless glands with abnormal conditions being well known. I can obviously do no more than call attention to these facts, any more definite

* Kernan and Schulte, Bull. Amer. Nat. Hist. Mus. vol. xxxviii. (1913).

† Schulte, "Anatomy of a Fœtus of *Balænoptera borealis*," Mem. Amer. Mus. Nat. Hist. vol. i. pt. vi. p. 443, pl. 1. figs. 1, 2.

suggestion being out of the question in the present state of our knowledge.

The median thyroid is very small when compared with the lateral. It occupies 14 sections only, while the lateral thyroid runs through 48. It is usual, of course, among Mammals for the isthmus of the thyroid to be small when measured against the lateral wings. In the actual sections, which are, of course, transverse, the outline of the lateral gland is mainly crescentiform, that of the median isthmus is circular. The median thyroid is not in the least continuous with the lateral piece. The two are quite separated with fibrous tissue, which is nowhere bridged. One can hardly, I should think, be an outgrowth of the other. The median thyroid shows the typical thyroid structure. It is entirely made up of vesicles, of which, since their structure is so well known, I need hardly do more than make mention. This is by no means the structure of the lateral mass, which is here referred to the thyroid. It consists of columns of cells which are of irregular shape and breadth, and which are separated by tracts of fibrous nucleated tissue. They have the characters therefore of the parathyroid—so called by many, including Mrs. Thompson, who has figured them in several mammals*.

These parathyroids, as described by Mrs. Thompson, enter into close relationship with the thyroid wings; there is complete fusion and the structure of the two bodies merges. Regularly formed vesicles, exactly like those of the thyroids, are to be seen at that end of the parathyroid body which is in connection with the thyroid wings. And it would appear that, although different in origin and at first in structure, the parathyroids and thyroids form one apparatus, which physiological considerations, into which I do not enter, seem to confirm. That, in fact, what is commonly called the thyroid is in reality produced by a fusion between two different glands—the thyroid proper and the parathyroid. These views are held by others, though not by all. It will be sufficient here to call attention to the statements of Prof. J. P. Hill and Miss Frazer†, who figure in the developing *Trichosurus* a union between the tissue of what they and also others term the ultimo-branchial body with the lateral thyroids. But there is here no question as to the original distinctness of the ultimo-branchials from the lateral

* "Thyroid and Parathyroid Glands throughout Vertebrates," Phil. Trans. 1910.

† "The Development of the Thymus &c. in the Marsupialia," Phil. Trans. 1916, pl. viii. figs. 50, 50 A.

thyroids. For the latter are in undoubted connection, and, indeed, quite continuous with the median thyroid. Hence these last-named authors regard the structure of the thyroid as "probably" due to proliferation of the ultimo-branchial bodies to fuse with the wings of the thyroid.

In the foetal *Sperm-Whale* with which I am concerned, the lateral body in question is not only cut off from direct union with the median thyroid, but they differ from each other, as already mentioned, in structure. It is, however, to be noted that the lateral body shows here and there obvious thyroid-like vesicles.

I particularly draw attention to the fact that in this "lateral thyroid" the commencing appearance of typical vesicles is not confined to that end of the body which is nearest, though it does not touch, the median thyroid. The commencing vesicles are seen at both ends. I imagine, therefore, that in the *Sperm-Whale* the whole of the lateral body is ultimately converted into thyroid tissue. The non-fusion of the median thyroid with the lateral body is, of course, further evidence of the independence of the origin of the latter, and Born has pointed out *—as duly noted by Hill and Fraser, who enter fully into the literature of this subject—that in the *Pig* there is a median unpaired thyroid, to which become attached lateral bodies of (at first) a different structural appearance which ultimately form the lateral lobes of the finished gland. In *Echidna*, again, there is a still closer approximation to the state of affairs indicated in *Physeter* (as I would interpret them); for Maurer † (as pointed out by Hill and Fraser) figures, in a woodcut of the adult *Echidna*, a body shifted far in front of the thyroid which corresponds to the ultimo-branchial, or, as called by Maurer, postbranchial, which possesses the structure of the thyroid. But an inspection of this figure suggests that the thyroid of *Echidna* may show in two lateral bits of the undoubted thyroid, which are detached from it and have nothing to do with any other body but the median thyroid, the perhaps more probable homologues of the single detached lobe of the embryo *Physeter*.

Finally—so far as these comparisons go—the asymmetry of the lateral part of the adult thyroid in *Physeter* suggests a comparison with the condition of the ultimo-branchials of the *Urodela*, which, according to Maurer ‡, are always

* Arch. Mikr. Anat. 1883, pl. xi. fig. 14 and in a woodcut on p. 297.

† In Semon's 'Forschungen in Australien,' Bd. iii. (1899).

‡ "Die Schilddrüse . . . der Eidechse," Morph. JB. 1899, p. 160. See diagram, p. 166.

unpaired, and in *Lacerta*, though sometimes paired, are generally unpaired, the left alone persisting.

In conclusion, it would appear very probable that the median thyroid of the *Physeter* embryo is all that there is of a true thyroid; that the single lateral lobe of the left side is not formed by an outgrowth of the median thyroid, since it is quite detached from it, and is in a younger stage of growth. Moreover, the structure of the lateral lobe differs from that of the median thyroid in that the cells are separated into columns by a considerable thickness of nucleated fibrous tissue, very much more pronounced than that which intervenes between the glandular vesicles of the median and undoubted thyroid. Comparisons with other Mammals suggest that this addition to the thyroid is the ultimo-branchial (postbranchial).

Epithelial Bodies.—I have found two pairs of these bodies whose shape and structure in transverse section seems to be exactly like that of the epithelial body figured by Hill and Frazer*. These are larger than the median thyroid and occupy 20–24 sections altogether. The anterior pair are symmetrically placed on a level with the dorsal end of the windpipe section, and just above (that of the left side, of course) the lateral thyroid.

The posterior pair of epithelial glands are not so symmetrical with each other. The right-hand one lies between the thymus below and the trachea above; the left-hand gland lies to the left of the trachea at about the level of the middle and above, but further away from, the thymus of the same side.

Frazer and Hill point out that “Epithelial bodies III. and IV. of *Trichosaurus* resemble those of *Echidna* and of the lower vertebrates in general, in that they acquire no secondary relationship with the thyroid, as do those of nearly all Eutheria”†. The same would appear, from the above description of those of *Physeter*, to be the case with at least this Cetacean also.

The *thymus body* of the *Physeter* embryo is confined to the thoracic region. I found no cervical portion. It ends behind in contact with the pericardium and extends forward through about 80 sections, and is thus the largest of the ductless glands of the neck. There was no ascertainable division of the gland into two parts, representing each of them a moiety belonging to two gill-slits. The gland was

* *Loc. cit.* pl. viii. fig. 64.

† *Loc. cit.* p. 62.

of even diameter throughout, and circular or approximately so in transverse section. No external division into lobes could be detected in the sections. The outer region was quite smooth; the gland thus differs from that of at least some other Mammals—for instance, *Trichosurus* *. I am not certain, however, that it really differs from the thymus of the Morqual, to which the figure of Schulte † gives a lobulated appearance. But I shall return to this point in describing the minute structure of the gland in *Physeter* in connection with other comparisons. In its smooth character this body in *Physeter* appears to agree with the gland of the Pigmy Sperm-Whale, where the external characters alone have been figured ‡ by Kernau and Schulte. The microscopic structure shows that the smoothness is due to the thickness of the outer sheath, which shows no evidence of the internal lobulation. This sheath is fibrous with numerous nuclei, and has no special characters excepting its great thickness. It is totally unlike the more usual form of the gland, such as is, for example, figured in Quain's 'Anatomy' §, and where the outer layer is inconspicuous as compared with the tissue lying within. It suggests, in fact, a later stage in the degeneration of the gland than would be expected from the age of the foetus, and is further evidence of the apparently early growth of embryonic characters as compared with the size of the foetus in the Cetacea into the adult condition. In the present foetus the great thickness of the outer layer of the thymus suggests the figure given by Watney || of that gland in a six-year-old Ox.

The "glandular" part of the thymus then occupies a relatively small area when the entire body is seen in transverse sections. It presents the appearance of a central area giving off radiating processes extending towards the circular periphery. The whole organ suggests more the growing lung of the same animal than such a body as the human foetal thymus constricted by growth of the fibrous sheath of the same. It is to be presumed, however, that the appearance is to be so explained. The centre of the thymus mass proper is hollow and the cavity extends for a

* *Zoo. cit.* (Frazer and Hill), pl. x. fig. 62, tm. III.

† "Anatomy of a Foetus of *Balanoptera borealis*," Mem. Am. Mus. Nat. Hist. vol. i. pt. vi. 1916, pl. 1. fig. 1, p. 12.

‡ Bull. Amer. Nat. Hist. Mus. vol. xxxviii.

§ 10th ed. 1896, p. 308, fig. 317.

|| "On the Minute Anatomy of the Thymus," Phil. Trans. 1882, pl. lxxiv. fig. 3.

varying distance peripherally at this point and at that. The hollow, however, has, as I believe, nothing to do with any invagination cavity. Its walls are not clear-cut, but granular lumps are adherent to them here and there. It would seem, in fact, that the cavities are due to a breaking down of the medullary layer of the thymus tissue. The "outgrowths" from the central mass are occasionally tubular for some distance, and in any case end peripherally in a swollen extremity.

It is possible that the lobation of the thymus, which has been referred to above, in *Balænoptera* is an expression of similar structures.

In any case, there would seem to be no division of the gland into lobes as in the human thyroid, for example. There is no division into separate lobes by complete ingrowths of the fibrous layer; the partial ingrowths found in *Physeter* divide what is equivalent of a single lobe into numerous nodules or follicles, as these subdivisions are termed in the human thymus. The tissue forming the gland part of the thymus is, as in other animals, divided into cortical and a medullary layer, the breaking down of which, as already suggested, may have led to the formation of the internal cavities.

XL.—On new Curculionidæ from India (Coleoptera).

By GUY A. K. MARSHALL, C.M.G., D.Sc., F.R.S.

Subfamily RHYNCHITINÆ.

Rhynchites bucklandiæ, sp. n.

♂ ♀. Colour blue-black, thinly clothed with subrecumbent and obliquely raised pale and dark hairs; the mouth red-brown.

Head about as long as broad, with coarse punctures, each containing an obliquely raised pale hair; the eyes projecting only slightly beyond the sides of the head in ♀, a little more so in ♂. *Rostrum* as long as pronotum in ♂, half as long again in ♀, with a smooth median costa in the basal half and a narrow carina on each side separated from it by a punctate sulcus; the apical half strongly punctate at the sides only, impunctate on the disk in ♂ and with only a few small punctures in ♀; a carina from the lower edge of the scrobe to the eye and the lower surface tricarinate.

Antennæ inserted in the middle of the rostrum and slender; the three basal joints of the funicle elongate and subequal, joint 1 the thickest and longer than the scape, 4 a little shorter than 3, 5 half as long as 4 but longer than broad, 6 and 7 slightly transverse; joint 1 of the club as long as or a trifle longer than broad, 2 transverse, and 3 longer than broad. *Prothorax* a little broader than long (8:7), widest at the base and gradually narrowed to the apex, the sides only slightly rounded, the basal margin not raised; the dorsum closely and strongly punctate throughout, with a narrow median carina which reaches neither base nor apex and varies in development. *Scutellum* trapezoidal, punctate and setose. *Elytra* suboblong, broadest behind the middle, without dorsal impressions or a scutellar stria; the striae very shallowly punctate, much narrower than the intervals, which are convex and closely irregularly punctate; stria 9 uniting with 10 at about the middle; on the basal third, the apical declivity, and on the whole of the two lateral intervals the hairs are grey with a pale blue reflection, on the remainder of the intervals they are black, but in every stria there is a single row of subrecumbent pale hairs. *Venter* with very shallow confluent punctation and sparse recumbent pale hairs.

Length 3-4 mm., *breadth* 1.5-2 mm.

SIKKIM: Senchal R., Darjiling, on *Bucklandia populnea*, 20. vii. 1923 (J. C. N. Gardner).

Type in the British Museum; described from twelve specimens.

Allied to *R. argutus*, Fst., and *R. plumbeus*, Roel., but these both differ, *inter alia*, in their much denser, longer, and uniformly pale hairs and in the absence of a median carina on the pronotum.

Rhynchites pristis, sp. n.

♂ ♀. Colour dark blue, rather shiny, the elytra purple; clothed throughout with rather dense short erect hairs that are grey in some lights and pale blue in others.

Head a little broader than long, the forehead with coarse punctures that are usually more or less confluent longitudinally; the eyes very prominent; the lower surface in front of the transversely carinate basal area shallowly impressed in ♀, finely scrobiculate, clothed with dense erect dark hairs, and with a high smooth median carina (usually bearing a shallow longitudinal stria) and a broad curved smooth impunctate cleft on each side; the same area in ♂

impunctate, with a Y-shaped median carina (the fork directed backwards and the area enclosed by it striolate) and a broad smooth furrow on each side of it containing a few erect pale hairs posteriorly, and bounded externally by a smooth carina that extends from the rostrum to the middle of the eye. *Rostrum* elongate and strongly curved, distinctly longer than the head and prothorax, and of about the same length in the two sexes; in the ♀, subcylindrical, slightly dilated at the apex, with the antennæ inserted in the middle, a broad low smooth median carina in the basal half and an irregular duplicated series of punctures on each side of it, a very deep broad smooth sulcus running from the eye to the antenna with its sides carinate, the apical half with fine sparse irregular punctation, and the lower surface with three narrow carinæ separating four punctate striæ; in the ♂, with the antennæ inserted at one-fourth from the apex, the punctures coarser and the median carina more prominent, the lower edge of the lateral sulcus not carinate but armed with laterally projecting large jagged saw-like teeth, the lower surface with the striæ and carinæ much less definite and not extending forwards beyond the antennæ. *Antennæ* of ♂ elongate, fairly stout, all the joints longer than broad; joint 1 of the funicle shorter than the scape, 2 about as long as 1 and the scape together, 3 longer than 2, 4 equal to 2, 5 slightly shorter, 6 slightly shorter still but more dilated towards the apex, and 7 a little shorter than broad with the anterior apical angle more produced, the club with all the joints longer than broad, the apical one very sharply acuminate; in the ♀ the antennæ are much more slender, joint 7 of the funicle slightly transverse, and the club shorter and much less acuminate. *Prothorax* of ♂ slightly transverse, strongly rounded at the sides, broadest behind the middle, much narrower in front than behind, broadly depressed transversely at the base, the basal margin carinate and bisinuate, the dorsum convex, with strong separated punctures, which become obsolescent at the sides; in the ♀, almost as long as broad, much less rounded at the sides, broadest at or near the base. *Scutellum* trapezoidal, widest at the base, broadly truncate at the apex, and fairly densely clothed with pale blue recumbent hairs. *Elytra* subquadrate, a little longer than broad (5:4), parallel-sided, with the basal margin extending forwards beyond the base of the scutellum and narrowly covering the base of the prothorax; the shallow striæ containing large and closely set punctures, which contain no setæ and are much reduced behind, stria 9 uniting with 10 well behind the middle, no scutellar stria;

the intervals broad, with strong close irregular punctures and numerous irregular erect hairs; on the inflexed margin a shallow transverse impression at about one-fourth from the base. *Legs* stout, the femora thinly and the tibiæ densely clothed with suberect pale hairs; the femora of ♂ thicker than those of ♀, especially the front pair, which have on the basal third of the lower surface a large deep semicircular excision, the basal angle of which is formed by a sharp tooth projecting from the trochanter; the front femora of ♀ simple, but with the trochanter slightly and obtusely projecting; the front coxæ of ♂ only with a dense tuft of short pale hairs behind the apex; the tibiæ all with a finely notched carina along the dorsal edge, and a less definite smooth carina on the basal half of the outer face, and the lower surface of the front pair (in ♂ only) flattened, rugulose, and bearing a carina.

Length 7·2–10·5 mm.; *breadth* 3·9–5·4 mm.

ASSAM: 8 ♂, 8 ♀, Chandkhira, Sylhet (*J. L. Sherwill*, type); 1 ♀, Khasi Hills. UNITED PROVINCES: 1 ♀, Dehra Dun, 10. ix. 1919.

Type in the British Museum.

Allied to *R. caelestinus*, Gyl., from Sumatra, but at once distinguished from it and its other allies by the remarkable toothed rostrum and excised front femora in the ♂, and the structure of the lower surface of the head in the ♀; moreover, *R. caelestinus* is rather larger, the hairs are grey and not pale blue, the sculpture is very much finer (especially on the pronotum), the rostrum much longer (about three-fourths the length of the whole body), etc.

Subfamily OTIORRHYNCHINÆ.

Cyrtopistomus * *pini*, sp. n.

♂ ♀. Derm testaceous-brown, rather thinly clothed with small shortly-ovate grey scales having a pale brassy lustre, and with numerous irregular spatulate and subrecumbent setæ; the scales on the disk of the elytra appear to be very easily abraded, but there is always a dense line along the suture.

Head finely striolate longitudinally; the forehead flattened or shallowly depressed, much broader than the space between the ocellæ, and without any median stria or fovea; the scaling much denser below the eyes, which are moderately convex. *Rostrum* a little shorter than its basal width,

* Marshall, Ann. & Mag. Nat. Hist. (8) xii. 1913, p. 186.

gradually narrowed from the base to the middle, thence moderately dilated; the epistome flattened, with its posterior margin very broadly rounded; the dorso-lateral carinae extending for little more than half the distance from the antennae to the eyes, the space between them almost flat and bearing a distinct fine median carina, the whole surface as well as the lateral areas finely striolate. *Antennae* slender, the scape not quite reaching the middle of the prothorax, gradually clavate and thinly clothed with recumbent setae; the joints of the funicle in order of length: 2, 1, (3, 4), (5, 6), 7. *Prothorax* much broader than long (10:7), markedly constricted at the base and there not broader than the apex, gently rounded at the sides, widest a little behind the middle, and with a slight constriction at some distance from the apex; the basal margin subtruncate and feebly bisinuate, the apex very shallowly sinuate in the middle of the dorsum, the postocular lobes almost obsolete and with a thin fringe of long vibrissae; the dorsum with fine confluent rugulose punctation throughout, which is readily visible through the sparse scaling and narrow compressed setae, and with a shallow transverse impression in the anterior half. *Scutellum* longer than broad, rounded at the apex, and sparsely squamose. *Elytra* parallel-sided (σ) or slightly widened behind the middle (φ), with a very shallow oblique impression on the disk at about one-fourth from the base, the shoulders roundly rectangular; the punctures in the striae distinctly visible through the scaling, the intervals broad and flat; the scales shortly ovate and sometimes almost circular, the setae subrecumbent, compressed and truncate. *Legs* thinly clothed with pale scales and setae, the front tibiae shallowly bisinuate internally.

Length 5-5.5 mm., *breadth* 2-2.25 mm.

UNITED PROVINCES: Airadeo, Kumaon, vi. 1912 (*Dr. A. D. Imms*); Bhowali, 5700 ft., Kumaon, vi. 1914 (*C. F. C. Bresson*, type).

Type in the British Museum; described from eleven specimens.

Most nearly allied to *C. jucundus*, Redt., but the latter is rather larger, black, and with dense green scaling; the forehead and rostrum are not striolate, and the former bears a short median stria; the pronotum is not rugulose; the setae on the elytra are cylindrical and erect, and there is only a single row of them on each interval, etc.

The adults are recorded as feeding on the needles of the chir pine (*Pinus longifolia*).

Cyrtepistomus glebosus, sp. n.

♂ ♀. Derm brown, with dense scaling; the head, rostrum, and pronotum with brown scales, the last-named with two very indefinite, slightly paler, discal stripes; the elytra grey mottled with brown on the basal third and on the apical declivity, and with a large common shield-shaped indistinct brown patch behind the middle which extends outwardly to stria 5 and has its apex at the top of the declivity; the lower surface uniformly grey.

Head striolate, but the sculpture normally hidden by the dense scaling and subrecumbent scale-like setæ; the forehead much broader than the interscrobal space, flat or shallowly depressed in the middle, with a small median fovea; the eyes scarcely rising above the general curvature of the head. *Rostrum* about as long as its basal width, gradually narrowed from the base to beyond the middle, dilated again at the genæ; the dorso-lateral carinæ almost obsolete, the dorsal area gradually widening behind, very shallowly impressed, not striolate, and with a fine median carina, which is usually hidden by scaling in the basal half; the lateral areas striolate, with two deeper striæ enclosing a low costa; the epistome sloping steeply in front, the hind margin carinate and forming a very broad flat curve. *Antennæ* with the scape slender, cylindrical, gently curved, gradually clavate, and clothed with narrow scales and subrecumbent setæ; the joints of the funicle in order of length: (1, 2), (3, 4), (5, 6, 7). *Prothorax* transverse, widest in the middle and with the sides there gently rounded; the dorso-lateral margin in the basal half compressed into an obtuse curved ridge which terminates at the basal angle in a very sharp short point, projecting obliquely backwards and fitting closely to the elytron; the apical margin distinctly sinuate dorsally in the middle, and a little narrower than the base which is shallowly bisinuate, the postocular lobes well developed and bearing a few short vibrissæ; the dorsum rather flattened, with a broad shallow depression on each side near the base, the surface smooth, with separated deep punctures that are indicated through the scaling, each containing a minute subrecumbent spatulate seta. *Scutellum* shield-shaped, a little longer than broad, rounded at the apex, squamose. *Elytra* parallel-sided (♂) or slightly wider behind the middle (♀), obliquely rounded at the shoulders, uneven dorsally; the shallow striæ often sinuous and rather irregular, with deep punctures that are clearly visible through the scaling, each containing a minute pale seta; interval 1

elevated on the upper half of the declivity, intervals 3 and 5 each with three long low elevations (two before and one behind the middle) and two or three small obsolescent tubercles on the declivity; the scales almost circular, small and closely packed; the setæ short, scale-like, and obliquely raised, larger and more numerous on the elevated parts. *Legs* densely squamose, the front tibiæ very feebly bisinuate internally. *Venter* of ♂ with a broad depressed area in the middle of ventrites 1 and 2 (nominal), set with numerous erect scales, each of which is split into a number of very fine long hairs, giving the appearance of dense pubescence; in the ♀ this area is less depressed, the scales are quite small and recumbent, but briefly plumose, and there are scattered short erect setæ.

Length 5.5–7.0 mm., breadth 2.25–4.0 mm.

UNITED PROVINCES: 1 ♂, 1 ♀, Mussoorie, 6500 ft., vi.–vii. 1920 (*S. N. Chatterjee*, type); 2 ♂, Ramgarh, Kumaon, vi. 1914 (*C. F. C. Beeson*); 1 ♀, Chanhattia, 6000 ft., Kumaon, vi. 1915 (*Beeson*); 1 ♂, 2 ♀, Bhowali, 6700 ft., Kumaon, vi. 1914 (*Beeson*). SIKKIM.

Type in the British Museum.

Allied to "*Cyphicerus*" *deplanatus*, Fst., which must be referred to *Cyrtapistomus*, but in that species the rostrum is evidently longer than broad, the dorso-lateral carinæ are distinct, and the margin of the epistome is strongly curved; the formula of the funicle is: 2, 1, 8, (4, 7), 5, 6; the sides of the prothorax are straight and oblique, and the posterior angles much more produced, so that the base of the prothorax is as wide as the elytra at the shoulders; the elytra are flattened on the disk and bear no tubercles; and in the pubescent ventral area of the ♂ the hairs are much shorter, the scales not being divided down to their base.

The adults have been found feeding on the needles of the chir pine (*Pinus longifolia*).

Subfamily CLEONINÆ.

Larinus saussureæ, sp. n.

♂ ♀. Derm black, with markings formed of grey pubescence (in depollinated specimens); the forehead and head pubescent; the pronotum with a very narrow indistinct median line of pubescence and a broad well-defined complete lateral stripe with its inner edge regularly curved and widest at the middle; the elytra with an irregular submacular pubescent stripe on intervals 2–4, which is more or less interrupted before and behind the middle, and a still

more broken and very indefinite stripe along the lateral margin; the metasternum clothed with fairly dense long fine hairs; the venter densely pubescent, the three intermediate ventrites each with a small bare shining spot on each side.

Form comparatively elongate. *Head* with very fine rugulose punctation and without any frontal impression; a fringe of longer hairs along the inner edges of the eyes. *Rostrum* differing but little in the two sexes, but slightly longer in the ♀, in which it is a little longer than the middle line of the pronotum, about as thick as the club of the front femur, cylindrical, curved, finely rugulose, with a faint obtuse median carina in the basal half and a narrow median fovea between the antennæ; the lower surface flattened and not carinate. *Antennæ* with joint 1 of the funicle thicker, but only slightly longer than 2. *Prothorax* a little shorter than its basal width, subconical, gently rounded at the sides and very shallowly constricted near the apex, the postocular lobes strongly developed; the dorsal surface rugosely punctate and slightly uneven, the intervals with very fine confluent punctures; the lateral pubescent stripe containing a single small shiny granule before the middle; the apex of the median basal lobe sunk much below the level of the elytra. *Scutellum* invisible. *Elytra* much broader at the shoulders than the base of the prothorax, elongate, broadly rounded behind, the sides (as seen from above) shallowly sinuate before the middle; the shallow striae with strong deep punctures, the intervals flat and finely aciculate, the posterior callus feeble. *Legs* with the lower surface of the femora clothed with long hairs; the front tibiæ with the inner edge shallowly bisinuate and not denticulate.

Length 6.2-8.8 mm., *breadth* 2.75-4.2 mm.

UNITED PROVINCES: Dehra Dun, bred from flower-heads of *Saussurea candicans*, iv. 1923 (*S. N. Chatterjee*).

Type in the British Museum; described from eight specimens.

No typical *Larinus* appears to have been described previously from India, and the species differs from all the Palearctic species known to me in its elongate form and comparatively narrow subconical prothorax.

Larinus assamensis, sp. n.

♂ ♀. *Derm* black. The prothorax with a bilateral stripe of thin grey setæ, its inner edge strongly curved, deepest in front of the middle; the elytra mottled with spots and patches formed of denser grey setæ.

Head very closely and finely punctulate above, and with scattered large punctures, striolate at the sides, and the lower surface coarsely striate transversely; the forehead convex, with a round median fovea; the setæ very short and sparse, but a fringe of longer ones along the upper margin of the eyes. *Rostrum* as thick as the front femora, about as long as (♂) or a little longer than the pronotum (♀), cylindrical, only very slightly curved, very finely and closely punctate throughout in both sexes, with separated larger punctures at the sides in the basal half, and without a trace of carinæ; the lower surface in the ♂ with a lanceolate flattened impressed area which is rather coarsely punctate and setose, this area being almost obliterated in the ♀. *Antennæ* with joint 2 of the funicle equal to or very slightly longer than 1. *Prothorax* somewhat broader than long, widest at the base, subconical, gently rounded at the sides, shallowly constricted at the apex, and with the postocular lobes feeble; the dorsum convex, closely and rather coarsely punctate, the intervals closely punctulate, usually with a very short median furrow and a very feeble rounded impression in the middle at the apex, and with a deep depression on the medial basal lobe, the broadly rounded apex of which is turned upwards. *Scutellum* visible, but small. *Elytra* ovate, distinctly broader at the shoulders than the base of the prothorax, not sinuate at the sides, broadly rounded at the apex; the shallow striæ with strong punctures which become much shallower behind, the intervals plane, very finely and closely punctate, intervals 8 and 9 with a very shallow transverse impression at about one-third from the base, the basal margin longitudinally striate, and the posterior callus feeble. *Legs* with the front tibiæ distinctly bisinuate and finely denticulate. *Sternum* with two small tubercles behind the front coxæ. *Venter* finely and confluent punctate, rather thinly clothed with short fine hairs.

Length 8½–12 mm., breadth 3·75–5·75 mm.

ASSAM: Shillong, Khasi Hills, on thistles, viii.–x. 1919 (T. B. Fletcher, type); N. Manipur (Doherty).

Type in the British Museum; described from twenty-five specimens.

In Petri's key to the Palearctic species of *Larinus* this insect runs down to *L. meleagris*, Fst. (Japan), which it very closely resembles, but that species differs in the following particulars: the rostrum more strongly punctate, with traces of carinulæ in the basal half of the dorsum, the larger lateral punctures more confluent; the pronotum with the larger punctures also much coarser and more confluent, and the

apex of the median basal lobe much narrower; the scutellum smaller and reduced to a very narrow strip; the elytra with the basal curve distinctly flatter, the punctures rather larger, the intervals slightly narrower and for the most part transversely rugulose; the prosternum without the two small tubercles behind the coxæ; and the median lobe of the male aedeagus slightly more narrowed at the apex.

Subfamily *HYLOBINÆ*.

Dyscerus longiclavis, sp. n.

♂ ♀. Derm dull black, very sparsely and unevenly set with brown setiform scales, which are most numerous on the posterior declivity and usually form a small spot on intervals 2, 6, and 10 before the middle; the venter with patches of similar scales at the lateral margins of the three intermediate ventrites.

Head closely and finely punctate on the vertex, more coarsely so on the forehead, with a deep round frontal fovea and a shallow furrow round the upper margin of the eye. *Rostrum* about as long as the pronotum, gently curved and slightly dilated at the apex; the male with five carinæ separating six shallow and coarsely punctate sulci, the median carina being narrower and more regular than the others; in the ♀ the dorsal carinæ and sulci become obsolescent beyond the middle. *Antennæ* with joint 2 of the funicle half as long as 1 and about as long as broad, 3-7 subequal and transverse, 7 not wider than 6; the club very elongate, a little longer than the funicle (6:5), widest at two-thirds from the base. *Prothorax* a little broader than long, parallel-sided from the base to the middle, then roundly narrowing to the apex, without any definite subapical constriction; the apical margin gently arcuate dorsally, the postocular lobes moderately developed, the base shallowly bisinuate; the dorsum very coarsely punctate, the intervals bearing small tubercles which coalesce to form irregular oblique or longitudinal ridges, and with an irregular arched smooth abbreviated median carina. *Scutellum* shield-shaped, with very fine shallow punctures. *Elytra* about one-fourth broader than the prothorax, with the shoulders roundly rectangular, parallel-sided to beyond the middle, the apices separately pointed; the shallow sulci containing large oblong foveæ which become indistinct at the sides and apex, where the sulci are deeper; the intervals on the disk narrower than the foveæ, somewhat uneven both horizontally and vertically,

and irregularly set with sparse flattened shiny granules, which coalesce to form a low ridge in the basal fourth of interval 8 and a lower shorter one at the base of 5, the posterior callus strongly developed. *Legs* with a small tooth on all the femora, which are coarsely rugose at the apex, the dilated portion being almost impunctate. *Sternum* with the intercoxal process of the mesosternum somewhat elevated; the metasternum very coarsely punctate at the sides, but with only a few shallow punctures in the middle. *Venter* with a few very shallow, widely scattered punctures.

Length 12–14.5 mm., breadth 4.5–6 mm.

BURMA: 2 ♂, 1 ♀, Tavoy, Tenasserim (*Doherty*, type). ASSAM: 1 ♀, Deju, N. Lakhimpur, 6. vii. 1910 (*H. Stevens*); 1 ♀, Chandkhira, Sylhet (*J. L. Sherwill*). SIKKIM: 1 ♂, Kurseong, vii. 1907 (Ind. Mus.); 3 ♂, Mungphu (*E. T. Atkinson*); 1 ♀, Darjiling (*L. V. Newton*). UNITED PROVINCES: 1 ♂, Jhajrah, Dehra Dun, 17. vi. 1906.

Closely allied to *D. clathratus*, Pasc., but in that species the club of the antenna is only about half the length of the funicle; the pronotum is not punctate, but set with small tubercles that do not coalesce, and the postocular lobes are strongly developed; the elytra have intervals 3 and 5 distinctly more raised than the others and carinate; the intercoxal process of the mesosternum is not elevated, etc. The elongate antennal club distinguishes *D. longiclavis* from every other species of *Dyscerus* known to me.

Dyscerus furcatus, sp. n.

♂ ♀. Derm black or piceous, rather shiny, thinly clothed with short stout recumbent fulvous setae, condensed here and there on the elytra to form small indefinite spots; these tend to form a very indistinct oblique row of spots from one-fourth from the base on interval 10 to the suture well behind the middle, and there is usually a small patch on intervals 2 and 3 at the top of the declivity, and two behind the posterior callus on intervals 2 and 9.

Head with fine close confluent punctation, with a round frontal fovea and a shallow furrow round the upper edge of the eyes. *Rostrum* similar in the two sexes, about as long as the pronotum, gently curved, slightly dilated at the apex, coarsely and confluent punctate, and with five narrow, undulating, and often indistinct carinae. *Antennae* gradually widening from joint 2 to 7, joint 2 more than half as long as 1 and longer than broad, the remaining joints transverse; the club of normal form, as long as the five preceding joints.

Prothorax very slightly broader than long, gently rounded at the sides, broadest at the middle, more narrowed in front than behind, feebly constricted near the apex; the apical margin truncate dorsally, the postocular lobes feeble, and the base distinctly bisinuate; the dorsum coarsely and confluent punctate, the intervals being raised and shiny, and with a short smooth median carina in the anterior half, which is replaced in the basal half by a short stripe of fulvous setæ. *Scutellum* flat, almost circular, shallowly punctate. *Elytra* about one-third wider than the prothorax, with the shoulders roundly rectangular, parallel-sided to far beyond the middle, and abruptly constricted at some distance from the apex, the apices themselves being much produced, separately and remotely acuminate; the striæ shallow, with quadrate punctures which are evanescent near the apex; the intervals rather narrower than the foveæ (on the disk), bearing small flattened irregular shiny granules, the alternate intervals not more raised, but 3 slightly elevated near the base and 1 flattened and scarcely granulate in the basal half; the posterior callus strongly developed but broadly rounded. *Legs* with a stout tooth on all the femora, which are rugosely punctate and sparsely setose throughout. *Sternum* with the mesosternal process not elevated; the metasternum coarsely punctate at the sides, much more finely and closely punctate in the middle. *Venter* with fairly close shallow punctation throughout; the surface more flattened in the ♂ and with the median basal impression better defined and extending right to the base.

Length 6.75–9.5 mm., *breadth* 2.5–8.25 mm.

UNITED PROVINCES: W. Almora, Kumaon (*H. G. Champion*); Ranikhet, Almora dist., Kumaon (*H. G. C.*, type).

Type in the British Museum; described from ten specimens.

Distinguished from the other species of the genus described from India by the strongly furcate apices of the elytra. In size and general facies it most closely resembles *D. apfya*, Pasc. (described as a *Hylobius*), but that species is deeper dorso-ventrally, the punctures in the striæ are much smaller, the intervals broader and with the granules very sparse and almost evanescent, the venter almost impunctate and very shiny, etc.

Subfamily CAMPYLOSCELINÆ.

Phænomerus reclinatus, sp. n.

♂ ♀. *Derm* piceous; the prothorax thinly clothed with greyish-white or stramineous squamiform setæ, with a slight

brassy reflection and all lying transversely, leaving on the disk four large subdenuded indefinite darker patches; the elytra with similar, much denser setæ, all of which are completely recumbent; interval 2 with the setæ brown from one-fourth from the base to a little beyond the middle, and a very indefinite variable patch of brown setæ on intervals 4-6 before the middle and another on intervals 3-5 behind the middle.

Head with small deep separated punctures, the forehead densely setose and much broader than the front tarsi. *Rostrum* of ♂ stout, subcylindrical and without any definite basal thickening, closely set with elongate punctures, and with a small distinct median carina from the base nearly to the apex and a carina on each side of it in the basal half, these latter gradually converging towards the base; the scrobes not extending beyond the antennæ (which are inserted behind the middle) and their lower margin not projecting laterally; in the ♀, parallel-sided in the basal third, then narrowing rather abruptly for a short distance and gradually widening again to the apex, the carinæ less distinct than in the ♂ and confined to the basal third, the apical portion much more finely punctate. *Prothorax* twice as long as its basal width, parallel-sided from the base to beyond the middle and thence rather abruptly narrowing to the apex; the dorsum reticulately punctate throughout and with a distinct median carina, the punctures somewhat confluent longitudinally in the middle of the disk only; the setæ on the disk narrow and yellowish, those at the sides broader and whiter. *Elytra* scarcely broader than the prothorax, cylindrical, with coarsely punctate striæ, the intervals narrow and finely punctate, the ♂ without any deep impression on the posterior declivity; the setæ on intervals 1-3 lying with their apices directed transversely or obliquely outwards, those on the other intervals with their apices turned inwards. *Legs* as in *P. sundevalli*, Boh., but the hind femora shorter, the edge of the tooth being on a line with the apex of the elytra.

Length 2.1-3 mm., breadth 0.5-0.7 mm.

ASSAM: Upper Dihing R., Lakhimpur, from *Dipterocarpus pilosus*, viii. 1921 (C. F. C. Beeson, type). BENGAL: Sunderbans, from *Heritiera fomes*, v. 1921 (Beeson).

Type in the British Museum; described from eight specimens.

From the three previously known Indian species of the genus—*P. sundevalli*, Boh., *P. angulicollis*, Mshl., and *P. brevirostris*, Mshl. (Ann. & Mag. Nat. Hist. (8) xix. 1917,

p. 197)—the present insect can at once be distinguished by the fact that there are no erect setæ on the posterior part of the elytra ; it agrees with *P. brevirostris*, and differs from the other two, in the relative shortness of the hind femora and in the absence of the deep fovea on the posterior declivity of each elytron in the ♂.

Subfamily *COSSONINÆ*.

Stereoderus dispar, sp. n.

Derm black, very shiny, entirely bare ; the antennæ and tarsi red-brown.

♂. *Head* shorter than its basal width, gently rounded laterally and narrowing from the base to the eyes ; the dorsum very minutely shagreened and set with widely-spaced punctures, the forehead flattened on the disk and bearing in the middle of its anterior margin two small tubercles separated by a stria. *Rostrum* transverse, gradually widening from base to apex, somewhat asymmetrical, the right apical angle being more produced outwardly than the left, the apical margin shallowly bisinuate, the epistome asymmetrical, the left side being more produced ; the dorsum sculptured like the forehead, with a similar, but more closely approximated, pair of tubercles in the middle of the base. *Prothorax* longer than broad, rounded at the sides, widest near the base, not constricted near the apex, which is narrower than the base, the basal margin carinate and distinctly bisinuate ; the dorsum with strong separated punctures, which are largest at the base and become gradually smaller anteriorly, there being usually an impunctate median strip from the base to beyond the middle ; the punctures on the pleuræ much shallower than those on the disk. *Scutellum* subtriangular, broadest behind, impunctate. *Elytra* with the usual nine rows of punctures, rows 1 and 2, and the basal third of rows 3 and 9 shallowly striate ; the punctures widely spaced, those in the first five rows much larger than the outer ones but gradually diminishing behind, those in rows 7 and 8 more numerous and more closely set than the others ; the intervals broad and smooth, each with a single row of minute punctures. *Sternum* evenly set with diffuse shallow punctures throughout ; the mesepimeron not impressed, bearing four or five strong punctures.

♀. With the head and rostrum much more finely and sparsely punctate, quite smooth, without shagreening or tubercles but suffused with a milky subiridescent opacity,

usually with a very short feeble median stria on the rostrum, forehead, and vertex, but these very apt to disappear, especially the last.

Length 4.5–6.0 mm., breadth 1.2–1.8 mm.

ASSAM: Upper Dihing R., Lakhimpur, under bark of mezenga (*Xanthoxylum* sp.), 24. v. 1921 (C. F. C. Beeson).

Type in the British Museum; described from ten specimens.

Sexual dimorphism of the kind indicated has not previously been recorded in this genus, but I find a quite similar case in *Stereoderus obsoletus*, Fauvel, from New Caledonia (erroneously described as a *Rhyncolus*), which is nearly allied to the present species, but differs in the absence of the frontal tubercles in the ♂, the rostral tubercle is not divided by a stria, the punctures on the prothorax are very much finer and the subapical constriction deeper, and the intercoxal process of the prosternum is almost parallel-sided instead of being strongly acuminate.

XLI.—*Some new Australasian Muridæ.*

By OLDFIELD THOMAS.

IN determining the mammals obtained in North Australia by Captain Wilkins's expedition, the following new forms prove to need description:—

Mesembriomys hirsutus rattoides, subsp. n.

General characters, including size, colour above and on limbs and tail, and characters of skull all as in true *hirsutus*. Hind feet, however, uniformly rather longer, and the under surface more or less greyish slaty throughout, with only the tips of the hairs dull whitish (as in *Rattus rattus rattus*). In *hirsutus* of the Northern Territory it is creamy whitish, scarcely or not dulled by slaty (as in *R. r. frugivorus*).

Skull as in *hirsutus*.

Dimensions of the type:—

Hind foot (dry) 70 mm.

Skull: condylo-incisive length 62; zygomatic breadth 32; upper molars 10.6.

Another specimen, less fully adult, measured in the flesh by Capt. Wilkins, gives the following dimensions:—

Head and body 330 mm.; tail 355; hind foot 70; ear 35.

Skull: condylo-incisive length 61.

Hab. Cape York Peninsula. Type from Cooktown; another specimen from Coen, rather further north; alt. 600' (Wilkins Expedition).

Type. Adult female. B.M. no. 1.3.4.1. Collected 26th July, 1899, and presented by Herbert C. Robinson, Esq.

This Cape York representative of the *M. hirsutus* of the Northern Territory is readily recognizable by its slaty-grey belly, which suggests that of the true black rat, as compared with the dull whitish of *Rattus rattus frugivorus*. The three available specimens of it have the hind foot 70–71 mm. in length, while in true *hirsutus* seven specimens give 64–68 mm. as the corresponding measurement.

Melomys cervinipes eboreus, subsp. n.

Like true *cervinipes* in the dark slaty-grey mixed belly, but smaller, with shorter tail, and rather darker in colour.

The upper surface is a rather darker and less reddish brown, and the belly-hairs are, in most cases, terminally washed with whitish instead of pale buffy. The feet and tail average shorter, the latter generally at least an inch shorter.

Skull smaller, the largest skull in the series 2·3 mm. shorter than in full-grown *cervinipes*, the nasals about 1 mm. shorter, and the teeth also perceptibly smaller.

Dimensions of the type (measured in the flesh):—

Head and body 135 mm.; tail 145; hind foot 28·5; ear 19.

Skull: greatest length 33·7; condylo-incisive length 32; length of nasals 11·5; upper molar series 6·8.

Hab. Ravenshoe, N. Queensland. Type from Dinner Creek, 2900'.

Type. Adult male. B.M. no. 22.12.18.11. Original number 38. Collected 5th May, 1922, by T. V. Sherrin, and presented by the Godman Exploration Fund. Ten specimens examined.

The considerable series of *Melomys* from Queensland obtained by Robin Kemp, T. Sherrin, and Capt. Wilkins's expedition show that they are divisible into three species, as follows:—

1. The large *M. cervinipes*, Gould, with dull-coloured slaty-mixed belly. Its range extends at least as far south as the Clarence River, New South Wales, its type-locality being Stradbroke Island, S. Queensland. It is itself divisible into two subspecies—a northern one, from Ravenshoe, Cape York, and the southern typical race, which ranges from Rockhampton southwards. The distinguishing characters of the two have been indicated above.

2. The rather smaller *M. banfieldi*, de Vis, with whitish

under surface, occurring commonly on the Cape York Peninsula. Lönnberg's *littoralis* would seem to be this species, although I have not yet been able to examine specimens from Dunk Island, the type-locality of *banfieldi*, so that it is just possible that the Cape York animal may prove different.

3. A very small species, corresponding in size with *M. murinus* of Murray Island, but apparently different enough to deserve separation.

Melomys australius, sp. n.

Size small, as in *M. murinus*, *muscalis*, and *lutillus*. General colour above of the usual buffy brown. Under surface most like that of *M. lutillus*, more or less strongly buffy, the throat and inguinal region whiter, and with an irregular and variable line of white along the middle of the belly, sometimes considerably broadened, but never with the sharply defined white belly found in *murinus* and *muscalis*.

Skull about as in *murinus*, but the interorbital region narrower in all the specimens available.

Dimensions of the type (measured in the flesh):—

Head and body 109 mm.; tail 109; hind foot 22; ear 15.

Skull: greatest length 28·6; condylo-incisive length 26·5; nasals 10; interorbital breadth 4·1; breadth of brain-case 13; palatal foramina 5; upper molar series 5.

Hab. Cape York Peninsula; type from Piara. Other specimens from Cooktown (*H. C. Robinson*), Skull Creek (*R. Kemp*), and Oliver River, Temple Bay (Wilkins Expedition, *J. E. Young*). An immature specimen from Port Darwin also appears to be the same species, but cannot be certainly determined.

Type. Adult female. B.M. no. 15. 3. 5. 51. Original number 2487. Collected 10th August, 1913, by Robin Kemp. Five specimens.

This small species I had hitherto supposed to be Lönnberg's *littoralis*, but the hind foot, skull, and tooth-measurements all indicate that his animal is the larger one I refer to *banfieldi*.

It is possible that in the future all the small forms from both sides of Torres Straits and on the islands in it may be considered as one species with several subspecies, but for the moment I think it advisable to give the continental animal a binomial name.

Melomys rubicola, sp. n.

A comparatively large species, with very long tail.

Size about as in *M. banfieldi*. General colour above dark buffy brown, the nape and middle area of posterior back more

strongly ochraceous. Under surface dull whitish, the belly with some grey-based hairs laterally. Hands and feet whitish. Tail very long, considerably longer than head and body, scaly, naked, brown above, lighter below, the tip curled and perhaps more prehensile than usual.

Skull about as large as in *M. banfieldi*, proportionally long and narrow, with long nasals; supraorbital ridges well-marked, evenly divergent; palatal foramina reaching nearly to the level of the front of *m*¹. Molars rather larger than in *banfieldi*.

Dimensions of the type (measured on the skin):—

Tail 180 mm.; hind foot 30; ear 17.

(A spirit-pecimen measures:—Head and body 140 mm.; tail 171; hind foot 31; ear 17.5.)

Skull: tip of nasals to back of interparietal 36.5; zygomatic breadth 19; nasals 13; interorbital breadth 6; breadth of brain-case 14.3; palatal foramina 6; upper molar series 6.8.

Hab. Bramble Key, Torres Straits, about 9° S., 144° E.

Type. Adult male. B.M. no. 46. 8. 26. 7. Collected by John Macgillivray in May 1845 during the voyage of the 'Fly.' Presented by the Earl of Derby. Other specimens collected during the same voyage by J. B. Jukes, and presented by him. A specimen from Long Island, 10° S., 143° E., also appears to be *M. rubicola*, but is not in a condition to be determined with certainty.

This *Melomys* is distinguishable by the unusual length of the tail, which is only exceeded in the aberrant *M. fulgens* and *talaudium*.

XLII.—*New Species of Phytophaga.* By G. E. BRYANT, Entomological Assistant, Imperial Bureau of Entomology.

Family Cricoceridæ.

Brachyductyla fulvicollis, sp. n.

Oblong, parallel-sided, contracted in front, depressed, fulvous, with the seven apical joints of the antennæ, the elytra, and tarsi black.

Length 8 mm.

Head fulvous, not so broad as prothorax, eyes rather prominent. *Antennæ* filiform but robust, the first four joints fulvous and glabrous, the last seven joints black and slightly broader, with the last narrowed to apex, extending a very little beyond the base of the prothorax. *Prothorax* fulvous, subquadrate, broader than the head, with a slight transverse depression near the base, the sides compressed from the

middle to the base, anterior margin oblique on either side of the insertion of head. *Scutellum* triangular, fulvous. *Elytra* black, punctate-striate, more strongly so at the sides, much broader than the prothorax, almost parallel-sided, twice as long as broad, rounded to apex. *Legs* fulvous, rather stout; tarsi black, with the fourth joint inserted in the third, the claws free. *Underside* fulvous, with prosternum hardly visible between the coxæ; the first ventral segment of the abdomen about equal in length to the second and third together, all the segments clothed with slight pubescence.

PORTUGUESE W. AFRICA: San Thomé, 19 specimens, 1920 (*F. W. Urich*).

I prefer to place this new species in the genus *Brachyductyla* on account of the tarsal structure, in spite of the prosternal characters breaking down, for it seems better not to make a new genus at present, as this only makes the fourth described species. Pic has made a subgenus *Pseudocrioceris* for *B. microdera*, Lac., and *B. annulipes*, Pic, in order to separate them from the Javan species *B. discoidea*, Guér.; but *B. microdera*, from Madagascar, seems to me more closely allied to *B. discoidea*, from Java, than to *B. annulipes*, from Zanzibar.

Family Eumolpidæ.

Trichotheca æneopicea, sp. n.

Brownish æneous, with the exception of the labrum, palpi, base of the antennæ, anterior margin of the prothorax, and the basal half of the femora, which are pale fulvous.

Length 4.5 mm.

Elongate, clothed with rather long scattered greyish pubescence. *Head* brownish æneous, strongly punctured, with a short longitudinal impression between the eyes. Labrum and palpi pale fulvous, the mandibles darker. *Antennæ* reaching to about the basal third of the elytra, the three basal joints pale fulvous, the fourth joint dark with the basal half fulvous, the fifth to the apex all dark; the basal joint much thicker and twice as long as the second, the third more slender and about equal in length to the first, the fourth about equal to the second and third combined, the fifth a little shorter than the fourth, the terminal joints rather shorter and broader. *Prothorax* brownish æneous, about as long as wide, sides slightly rounded, widest about the middle, strongly punctured, and with scattered greyish pubescence, the anterior margin narrowly fulvous. *Scutellum* trigonal, slightly punctured. *Elytra* brownish æneous, much wider at the base than the prothorax, oblong, widest behind the middle and rounded to apex, transversely depressed below the

base near the scutellum, the surface strongly punctate-striate, with long greyish scattered pubescence. *Legs* rather long, with the femora somewhat dilated, feebly toothed below, the basal half pale fulvous; tarsi slender and elongate, claws toothed at base. *Underside* brownish æneous, the first ventral segment a little longer than the second, the fifth ventral segment fulvous.

INDIA: Kangra District, Punjab, 28. v. 1922, 3 specimens (O. H. Walters).

Allied to *Trichotheca basifemorata*, Duv.

Nodonota theobromæ, sp. n.

Metallic-green below, above with the head and prothorax deep metallic-green, and the elytra deep metallic-purple, the antennæ and legs ferruginous; the prothorax transverse, with rather strong scattered punctures; the elytra with rows of strong punctures widely placed.

Length 3–4 mm.

Shape oblong. *Head* metallic-green, the surface slightly rugose with fine punctures, the clypeus with two oblique grooves, the labrum and palpi fulvous. *Antennæ* ferruginous, with the apical joints slightly fuscous, extending to about the middle of the elytra in the male; the two basal joints large and rounded, the second smaller than the first, but much broader and shorter than the third. *Prothorax* transverse, with the sides rather straight, but strongly contracted in front, and slightly notched in front before middle, the disc rather strongly punctured. *Scutellum* about as broad as long, impunctate. *Elytra* broader at the base than the prothorax, with the sides almost parallel and then rounded to the apex, with rows of strong and widely placed punctures, the humeral callus smooth and prominent. *Underside* metallic-green; the prosternum with a few deep scattered punctures; meso- and metasternum almost impunctate, with scattered pubescence; the first ventral segment about twice as long as the second, the remainder about equal to each other, the apical segment with a deep notch in centre. *Legs* ferruginous.

♀. Distinguished by its much larger size, slightly shorter antennæ, and apical ventral segment without a deep notch.

BRAZIL: Bahia (Dr. G. Bondar).

Dr. Bondar states that the adult beetles feed on the leaves of Cacao.

Allied to *N. grenadensis*, Jac., but easily distinguished by its larger size, by its colour, especially by the colour of the underside, and the puncturation is not so strong; the shape is less rounded and the prothorax not so transverse.

Nodonota wolcotti, sp. n.

Oblong-ovate, entirely dark æneous, with the exception of the antennæ, labrum, and tarsi, which are ferruginous: clothed with short grey scattered pubescence, strongly and regularly punctured, the rows of punctures on the elytra being slightly stronger than those on the prothorax.

Length 3·5–4 mm.

Head dark æneous, evenly punctured, the punctures rather wide apart, with short scattered grey pubescence; a short longitudinal impression in the centre, a little behind the line of the eyes. *Antennæ* ferruginous, extending a little beyond the middle of the elytra. *Prothorax* dark æneous, transverse, widest at the base, with the sides rounded and narrowing to the apex, strongly and evenly punctured, the punctures rather widely separated, covered with short scattered greyish pubescence; basal margin slightly expanded in the middle. *Scutellum* very little broader than long, with the apical margin curved, impunctate. *Elytra* dark æneous, wider at the base than the prothorax, rounded and very slightly produced at the apex, more strongly punctured than the prothorax, with the punctures in the rows rather widely separated, with short grey scattered pubescence. *Legs* dark æneous, covered with short grey pubescence, the tarsi ferruginous. *Underside* dark æneous, with the sternum strongly punctured and clothed with scattered grey pubescence; the ventral segments smoother, with scattered punctures, the first segment the longest.

♀. Rather longer, and the elytra with two strongly raised longitudinal costæ near the lateral margin; the outer costa begins from the shoulder, and runs in a rather oblique line to the lateral margin; the inner costa runs only a short way from below the shoulder to a little beyond the middle, and is curved inwards at the base.

PORTO RICO: Yauco, etc., 2 ♂♂, 6 ♀♀ (*G. N. Wolcott*).

In curled leaves of *Croton* sp. and *Conocarpus erectus*, and in the rolled leaves of *Coccothia uvifera*, caused by an Attelabid weevil.

Allied to *N. cretifera*, Lef., but differs in being not nearly so metallic and much more pubescent, and in the inner costa being not nearly so much curved inwards; also its puncturation is stronger, and I know no species with quite such conspicuous grey pubescence.

Family Halticidæ.

Hermæophaga cubana, sp. n.

Entirely metallic-blue, with the exception of the mouth-parts and antennæ, which are black; prothorax impunctate,

the sulcus deep and sinuate, and interrupted laterally by a longitudinal sulcus; elytra convex, with very fine ill-defined rows of punctures, which become less marked towards the apex.

Length $3\frac{1}{2}$ mm.

Of robust subcylindrical shape and bright metallic-blue colour. *Head* with the base impunctate, the mouth-parts black; a well-defined carina between the insertion of the antennæ; the eyes large. *Antennæ* slender and filiform, black, with short grey pubescence; the first joint large, about twice as long as the second, the second shorter than the third, and the third to the eleventh about equal. *Prothorax* transversely convex, with the sides nearly straight, the anterior angles oblique, the posterior margin slightly produced in the middle; the basal sulcus deep, sinuate, and interrupted at the sides by a longitudinal groove; the surface impunctate. *Scutellum* impunctate, with a coppery tinge. *Elytra* cylindrical, slightly broader at the base than the prothorax, slightly produced towards apex, very finely punctured in ill-defined rows, which become fainter towards apex. *Underside* metallic-blue. *Legs* metallic-blue, the apical half of the tibiae clothed with greyish pubescence.

PORTO RICO: Guayana, 23. i. 1923, 3 specimens (*G. N. Wolcott*).

Very closely allied to *H. smithi*, Jac., from Mexico, but differs in its larger size, entirely metallic-blue colour, and the much finer punctuation.

Chirodica bicolor, sp. n.

Elongate; the head, prothorax, four basal joints of the antennæ, and the legs flavous, the apical joints of the antennæ fuscous; the elytra metallic greenish blue, finely punctate-striate. Underside with the meso- and metasternum and ventral segments black.

Length 2 mm.

Shape elongate, parallel-sided. *Head* flavous, impunctate, slightly impressed in the middle behind the insertion of the antennæ. *Antennæ* reaching nearly to the middle of the elytra, the first joint broader and longer than the second, the second to the tenth about equal, the eleventh a little longer and acuminate, the four basal and basal half of the fifth flavous, the remaining joints to apex fuscous. *Prothorax* flavous, transverse, slightly rounded at the sides, and feebly margined; the posterior margin slightly curved and transversely impressed at the base, not quite reaching the sides. *Elytra* a little wider at the base than the prothorax, somewhat flattened, metallic greenish blue, finely punctate-striate,

rounded at apex. *Legs* flavous, stout and rather short; the hind femora strongly incrassate, the tarsi with the first joint about equal to the second and third together. *Underside* with the prosternum flavous, the meso- and metasternum black; the ventral segments black, the fifth segment longer than the fourth and strongly notched in the male.

SOUTH AFRICA: Mossel Bay, Cape Province, viii.-ix. 1921, 20 specimens (*R. E. Turner*).

More closely allied to *C. fulvipes*, Baly, and *C. fulva*, Baly, than to the other four species—*C. chalcoptera*, Germ., *elongata*, Baly, *wollastoni*, Baly, and *puncticollis*, Jac.,—but very much smaller than any of them.

XI.III.—*On some Similarities in the Evolution of the Dentition in the Sirenia and Proboscidea.* By C. W. ANDREWS, D.Sc., F.R.S. (British Museum, Natural History).

In one of his papers Professor Osborn pointed out the advantage that the palæontologist enjoys of being practically immortal, in that he is able to survey the net result of evolutionary processes extending over thousands or even millions of years. To such an observer the occurrence in some lines of descent of a tendency to evolve in a particular direction often appears obvious. According to Osborn, this predetermination is due to a "similarity of hereditary potential." And when such similar modifications appear in two groups which, though they possess a common ancestry, have become widely differentiated from one another, there seems to be at least a strong presumption that this explanation is the true one.

The two groups which I propose to consider, especially with regard to certain common characters of their dentition, are the Sirenia and the Proboscidea. The close relationship of these two widely different orders was long ago pointed out by De Blainville, but it was not until the discovery of the early members of the two groups in the Eocene beds of Egypt that any definite evidence of their relationship was obtained. In the Catalogue of the Tertiary Vertebrates of the Fayum, Egypt (p. xxi), some of the chief reasons for assuming the common ancestry of the two groups were given in the following words:—

"The question of the origin of the Sirenia is of great interest, and there seems to be a considerable amount of

evidence in favour of the view first put forward by De Blainville that they are intimately related to the Proboscidea. In the first place, the occurrence of the most primitive Sirenians with which we are acquainted in the same region as the most generalized Proboscidean *Maritherium* is in favour of such a view, and this is further supported by the similarity of the brain-structure and, to some extent, of the pelvis in the earliest-known members of the two groups (see pp. 202 & 214). Moreover, in the anatomy of the soft parts of the recent forms there are a number of remarkable points of resemblance. Among these common characters may be noted the possession of:—(1) pectoral mammæ, (2) abdominal testes, (3) a bifid apex of the heart, (4) bilophodont molars with a tendency to the formation of an additional lobe from the posterior part of the cingulum. The peculiar mode of displacement of the teeth from behind forwards in some members of both groups may perhaps indicate a relationship, although in the case of the *Sirenia* the replacement takes place by means of a succession of similar molars, while in the Proboscidea the molars remain the same numerically, but increase greatly in size and number of transverse ridges. Dr. Chalmers Mitchell has lately shown (Trans. Zool. Soc. vol. xvii. (1905) pp. 464–7) that the *Sirenia* and Proboscidea resemble one another in the arrangement of the intestinal tract, and that in neither is there any trace of the Ungulate specialisation; it is also significant that he states that *Hyrax* likewise approaches the *Sirenia* in this respect. Although these points of similarity, taken separately, may be of no great value, together they supply a very strong argument in favour of the close relationship of the two orders.”

In the account of *Maritherium* and the *Sirenia* given in the same volume a number of further proofs of their common ancestry are noted. These, with some additional arguments, are summarized in Dr. W. K. Gregory's valuable memoir, "The Orders of Mammals" (Bull. Amer. Mus. Nat. Hist. vol. xxvii. 1910). Matsumoto has recently published an elaborate comparison of *Maritherium* with the other groups and discussed their interrelationships (Bull. Amer. Mus. Nat. Hist. vol. xlvi. 1923). So far as its position with regard to the Proboscidea and the *Sirenia* are concerned, his conclusions seem to differ little, if at all, from my own. On the whole, so far as proof is possible, it seems that it may be regarded as proved that the Proboscidea and the *Sirenia* had a common origin.

Although the common ancestor of the two orders probably

lived in the early part of the Eocene, by the end of that period the two groups had become as different from one another as possible. Thus the Sirenia were already completely adapted to aquatic life in shallow water; their pelvis and hind limb had been reduced to the point of becoming functionless, the snout was deflected, and the ribs and the vertebrae had become thickened and massive as in recent members of the order. On the other hand, the Proboscidea were becoming adapted to a more terrestrial life and by the beginning of the Oligocene the genus *Palæomastodon*, represented by several species of different sizes, had all the main features of the modern elephant; but the flexible trunk was still in an incipient stage and the dentition was that of a normal mammal, the milk-molars being replaced from below by the premolars, and the whole of the adult dentition being in wear at the same time. It is to the later changes in the condition of the dentition of these two widely separated groups that attention must be directed.

In several genera of Eocene Sirenians the full eutherian dentition is present (e. g., *Eosiren* and *Eotherium*) and in some cases at least all the premolars replaced milk-molars in the usual way. Very soon, however, a tendency to suppress the premolars and to retain the posterior milk-molars becomes manifest. Of these latter first the posterior one becomes molariform (e. g., in *Halitherium* of the Oligocene), then in the Pliocene *Felsinotherium* all the premolars are suppressed and the last two milk-molars are molariform, so that here there are five molariform cheek-teeth *in situ* at the same time, on both sides of the upper and lower jaws, none of them having any predecessors. All these teeth are bilophodont with a tendency to add a third ridge posteriorly. The series of forms above noted is that leading up to the Halicoridæ: the history of the Manatidæ is less well known. In the Eocene *Prorastomus*, the probable ancestor of the family, the dental formula seems to have been $i. \frac{3}{3}, c. \frac{1}{1}, pm. \frac{4}{4}, m. \frac{3}{3}$, or $pm. \frac{3}{3}, m. \frac{3-4}{3-4}$. In the recent Manatee the germs of the premolar teeth are found, but they never come into use: at first there are three molars in each jaw. These teeth are bilophodont with a tendency to form a third ridge. As the animal grows up a remarkable thing happens. Fresh molars of the same form as the others are added to the back of the series, which moves forward in the jaws, the anterior teeth being shed successively as they become worn. There may be from 8-11 molar teeth on each side of the jaws at the same time, and, according to Thomas

and Lydekker*, who have worked out the tooth-change in this animal in detail, the total number of molars on each side of the jaw that may develop during the animal's life is at least twenty, and may be as many as thirty. The consequence of this multiplication of bilophodont teeth is that we have what, in effect, is a polylophodont dentition in which the total number of transverse ridges may be as many as sixty, and these come into wear in succession from before backwards as the tooth-series moves forward. None of the individual teeth develop more than the two ridges and a small talon and all remain very low-crowned.

Turning now to the Proboscidea. In this group the history of the evolution of the dentition has frequently been told, so that here only a summary is necessary. In the earliest-known type *Mærittherium* (Upper Eocene) the dental formula is $i. \frac{3}{2}, c. \frac{1}{0}, pm. \frac{3}{3}, m. \frac{3}{3}$. The premolars are probably all preceded by milk-molars, which they replace from below: the first and second molars are bilophodont with a tendency to form a third lobe as in *Sirenia*, but the third molar has a well-developed heel. Passing up through the successive stages the premolars tend to become suppressed, and the most advanced form in which they are known is *Elephas planifrons*. At the same time the number of transverse ridges in the milk-molars and true molars becomes gradually increased, till in a highly specialized form like the Mammoth the ridge-formula, according to Leith Adams, may be $mm. 2 \frac{3-4}{3-4}, mm. 3 \frac{6-9}{6-9}, mm. 4 \frac{9-12}{11-12}, m. 1 \frac{9-15}{9-15}, m. 2 \frac{14-16}{41-16}, m. 3 \frac{18-20}{18-20}$.

Here there may therefore be as many as 85 transverse ridges, a polylophodont condition of even more advanced type than in the *Sirenia*, but here the condition is produced by the addition of plates to the normal milk and permanent molars, instead of the multiplication of the individual teeth. Another great difference from the ordinary Sirenian molars is the great gradual increase in the height and size of the tooth-crown, which is carried to an extraordinary pitch in the later elephants.

In the Proboscidea as in the *Sirenia* the replacement of the teeth is brought about by a forward movement of the series which brings the successively developed teeth into wear one after another. This movement is continued throughout

* "On the Number of Grinding Teeth possessed by the Manatee," Proc. Zool. Soc. 1897, p. 505, pl. xxxvi.

the animal's life, and, although a similar movement may occur in some other groups, it is only in the Proboscidea and Sirenia that it is carried out to such an extent.

Another very striking example of the occurrence of Proboscidean characters in a comparatively late member of the Sirenia is seen in the remarkable genus *Desmostylus*, which is represented by two species—one, *D. hesperus*, from the Miocene of California, the other, *D. japonicus*, from beds of a similar age in Japan. In these animals the teeth are quite unlike those of any other Sirenian, and are, indeed, so remarkably Mastodon-like that several writers, including Matthew and Abel, have actually regarded them as belonging to a Proboscidean. Abel* has recently endeavoured to prove that *Desmostylus* is a marine multituberculate, but it does not seem likely that his views will meet with any acceptance.

The teeth have comparatively high crowns composed of a varying number (3-9) of nearly cylindrical columns with thick enamel. The molars in which the greatest number of columns occur have an extraordinary general resemblance to the teeth of a small Mastodon. These teeth, according to Matsumoto†, seem to succeed one another from before backwards in an arc of a circle as in the Proboscidea.

To sum up, we have in the Sirenia and Proboscidea two groups of mammals which are almost certainly derived from a common stock, probably in the Lower Eocene period. By the end of the Eocene they had become about as widely divergent as two groups could be, one having become adapted to an aquatic, the other to a terrestrial life. Up to this time each had retained to a great extent the primitive structure and manner of replacement of the teeth. Subsequently, although the two groups were subjected to entirely different sets of environmental conditions, certain striking peculiarities in the dentition appear in both. Thus, there is a tendency towards the loss of the premolars and the molarification of the milk-molars: in both a multilophodont dentition arises, although in a different way in the two instances, and in both the teeth move forwards in the jaw throughout the animal's life, fresh ridges continually coming to wear from behind. It seems difficult to imagine that the occurrence of these similarities in two groups so widely

* "*Desmostylus*, ein mariner Multituberculatus etc.," *Acta Zoologica Arg.* iii. (1922) p. 361.

† "A Contribution to the Morphology and Systematic of *Desmostylus*," *Science Reports of the Tohoku Imperial University, Sendai, Japan*, vol. cxi. (1915-1918) p. 61.

different in their adaptive characters can be due to anything but what Osborn has called "similarity of hereditary potential." The occurrence of the hypsodont Mastodon-like teeth in *Desmostylus* is a phenomenon of the same nature.

In certain related groups of the Sauropsida Baron Nopcsa* has also noted the occurrence, after long separation, of similar characters—this he regards as the result of what he terms latent homoplasy.

XLIV.—*A new Species of Physaloptera [Nematoda] from an Australian Lizard.* By H. A. BAYLIS, M.A., D.Sc.

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THROUGH the kindness of Professor A. Dendy, F.R.S., the writer has had the opportunity of examining two male and four female specimens of what appears to be a new species of *Physaloptera*. They were taken alive from the "upper part of the eye-socket" of an Australian water-lizard (*Physignathus lesueurii*) that had died in captivity in New Zealand. The worms were forwarded to Professor Dendy by Mr. Gilbert Archey, Curator of the Canterbury Museum, Christchurch. The position of the parasites in the host is rather unusual, the organ occupied by *Physaloptera* being generally the stomach.

Twenty species (not including varieties) of *Physaloptera* have been described from lizards, though probably some of these are synonyms. The species under discussion cannot, apparently, be identified with any of the described forms. Five species, one of which has two varieties, have been recorded from Australian lizards. These are *Physaloptera antarctica*, v. Linst., 1899, with the varieties *typica* and *lata* distinguished by Miss Irwin-Smith †; *P. alba*, Stossich, 1902 (which, according to Ortlepp's revision of the genus ‡, is a synonym of *P. antarctica*); *P. bancrofti*, Irwin-Smith, 1922; *P. clelandi*, Irwin-Smith, 1922; and *P. simplicidens*, Ortlepp, 1923.

* "Die Familien der Reptilien by Dr. Franz Baron Nopcsa," Fortschritte der Geologie und Paläontologie, Heft 2, 1923, pp. 51, 61.

† Proc. Linn. Soc. New South Wales, xlvii. parts 3 & 4, pp. 232-244, 415-427 (1922).

‡ Proc. Zool. Soc. 1923, pp. 999-1107.

The following is a diagnosis of the species from *Physignathus* :—

Physaloptera physignathi, sp. n.

Body stout, tapering somewhat anteriorly. Cuticle with coarse transverse wrinkles and fine transverse striations. Males measure 13·25–14·7 mm. in length and 1·1–1·5 mm. in thickness; females up to 25·8 mm. and 1·9 mm. respectively. Lips rather small (0·13–0·16 mm. in width), each with a large conical external tooth, sometimes truncate at the tip. An almost continuous series of large denticles extends round the border of the mouth, passing across the inner surface of each lip and also occupying the interlabial spaces. Many of these denticles are bifid. Each lip also has two bifid denticles—one subdorsal and one subventral—placed slightly in front of the regular row. (These probably represent the bifid “outer teeth” occurring in many species of the genus.) Internal median teeth apparently not constant. Diameter of cuticular collar surrounding head about 0·23 mm. in male, 0·43 mm. in female. Length of entire oesophagus 3·5 mm. (male) to 5·2 mm. (female); its anterior muscular portion about 0·5 mm. long in male, somewhat longer in female. Nerve-ring at 0·4 mm., excretory pore and cervical papillæ at 0·75 mm., from anterior end in male; all these measurements correspondingly greater in female.

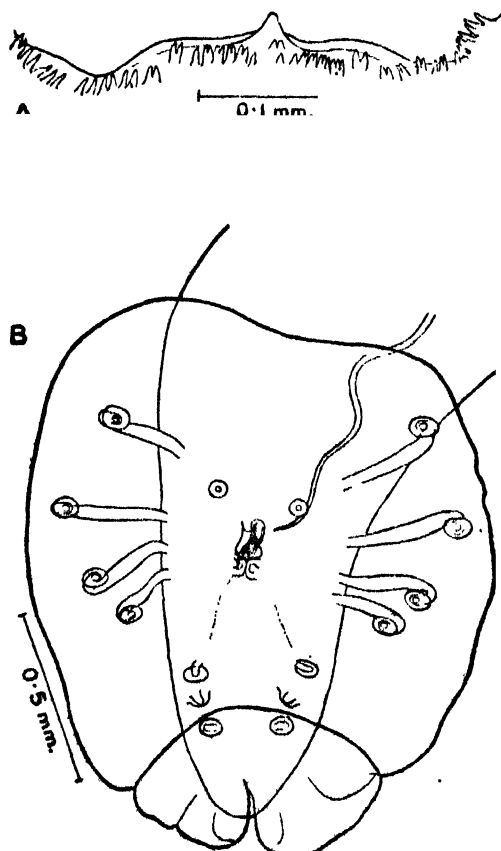
Tail of male 0·83–0·87 mm. long. Caudal bursa voluminous, vesicular, extending posteriorly beyond extremity of tail. Caudal papillæ nine pairs and probably one unpaired papilla. The space between the anterior of the four pairs of lateral pedunculated papillæ and the next pair somewhat greater than the spaces between the other pairs. The third of the usual group of three ventral preanal papillæ probably represented by a slight elevation on the anterior cloacal lip. One pair of large contiguous papillæ on the posterior cloacal lip, and three pairs of papillæ more posteriorly, in an equidistant series beginning at about the middle of the tail. The posterior of these situated on a conspicuous fold of the bursa. Spicules very unequal, both pointed; the left filiform, 2–2·4 mm. long and about 0·015 mm. thick, the right short and stout, 0·4 mm. long and about 0·04 mm. thick, expanding to 0·06 mm. or a little more at the root. Ventral surface of bursa provided with longitudinal rows of cuticular tubercles, mostly conical in shape, the tuberculated area extending from almost the anterior limit of the bursa to the posterior cloacal lip, and at the sides as far as the third pair of papillæ from the caudal end.

Tail of female about 1 mm. long, curved dorsally. Vulva a little in front of the middle of the body. Vagina narrow, turning posteriorly, and, after a course of about 2 mm., leading into a fusiform egg-reservoir about 2 mm. long. Beyond this is the very narrow common trunk of the uterus, which continues to run posteriorly, and, at about 6·5 mm. from the vulva, divides into two closely apposed branches. At 0·55 mm. beyond this point each of these divides again. There are thus four uterine branches. In the single specimen dissected one of each pair appeared to run anteriorly at first, and one posteriorly. Eggs embryonated when laid, measuring 0·0625–0·065 mm. $\times$ 0·0875 mm.

Syntypes will be deposited in the Canterbury Museum, Christchurch, New Zealand, and in the British Museum (Natural History).

All the species referred to from Australian lizards belong to the group in which there are four uterine branches originating by dichotomous division of the common trunk.

Apart from other characters, *P. physignathi* is distinguishable from *P. antarctica*, *P. bancrofti*, and *P. simplicidens* by the exceptional length of the left spicule and by the arrangement of the caudal papillæ in the male. Among the points in



Physaloptera physignathi, sp. n. A, one lateral half of mouth-border of female, spread out; inner surface, showing the external tooth of one lip and part of the series of denticles. B, caudal end of male ventral view. The right spicule, which protrudes from the cloaca is much foreshortened. The dotted line shows the posterior limit of the tuberculated area.

which it differs from *P. clelandi* (the male of which, unfortunately, is unknown) may be mentioned the much greater relative size of the denticles on the lips and the larger size of the eggs.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

November 7th, 1923.—Prof. A. C. Seward, Sc.D., F.R.S.,
President, in the Chair.

The following communication was read:—

‘On the Skeleton of *Iguanodon atherfieldensis* sp. nov., from the Wealden Shales of Atherfield (Isle of Wight).’ By the late Reginald Walter Hooley, F.G.S. (Read by Dr. A. Smith Woodward, F.R.S., F.G.S.)

The nearly complete specimen was obtained in 1914 from the Wealden Shales, near Atherfield. Many new facts concerning the skull of *Iguanodon* have been discovered. There is an essential similarity as regards the relationship of the bones of the skull to the American predentate dinosaurs, such as *Trachodon*, *Camptosaurus*, *Claosaurus*, *Gryposaurus*, etc. Grooves on the premaxillæ prove that the tip of the snout was sheathed in horn, and mark its extent. The quadrate bone is shown to have freely articulated with the squamosal, and there was a fore-and-aft action of the mandible, as in *Telmatosaurus transylvanicus*. The articulatory surfaces of the bones suggest that a slight movement of the postero-lateral regions of the skull was also possible. The tongue must have been extremely narrow, with a broad tip, and prehensile.

A study of the cervical vertebrae makes it apparent that the neck was habitually flexed, and that the point of greatest arching was at the ninth cervical.

All the pre-sacral vertebrae carry ribs. The diapophyses of the last dorso-lumbar vertebrae are pre-axially curved, probably the result of the habitual bipedal attitude. The sacrum comprises six fused vertebrae.

The ossified elements of the left carpus were preserved, and in natural articulation.

The portions of the integument discovered show that it was very thin and covered with small tubercles, interspersed with groups of large polygonal plates, as in *Trachodon*.

The estimated length of the skeleton is 6·8 m. (about 21·6 feet).

It is demonstrated that *I. atherfieldensis* is distinct from any known species, that the skull is intermediate in form between that of *I. mantelli* and *I. bernissartensis*, and that the bones of the remainder of the skeleton manifest the same characteristic.

THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY.
[NINTH SERIES.]

No. 76. APRIL 1924.

XLV.—*Orthoptera Dictyoptera* (Blattidæ and Mantidæ), and
Supplement to Gryllidæ, of the Seychelles and adjacent
Islands*. By Dr. IGNACIO BOLIVAR (Madrid).

BLATTIDÆ.

The Blattid fauna of the Seychelles and of the other archipelagoes visited by the Percy Sladen Trust Expedition is very interesting, not only on account of the number of species contained in it, but above all from the presence of special forms peculiar to several of the archipelagoes, such as the genus *Desmosia*, Bol., and the four new genera *Operculea*, *Delosia*, *Hololeptoblatta*, and *Distichopsis*.

* [The material here reviewed is part of the collections of the Percy Sladen Trust Expedition to the Indian Ocean under Professor J. Stanley Gardiner, F.R.S., in 1905 and 1908-9. Dr. Bolivar has previously (Ann. Soc. Ent. France, pp. 309-335, 1895) reported on the Orthoptera found in the Seychelles in 1892 by Mons. Ch. Alluaud and (Trans. Linn. Soc. London, ser. 2, Zool. pp. 283-292, pls. xiii., xiv., 1912) on the SALTATORIAL ORTHOPTERA collected by the Percy Sladen Trust Expedition, while the PHASMIDÆ of the latter expedition were described in a joint paper by him and Ch. Ferrière on pp. 293-300 of the last-named volume. The remaining families, BLATTIDÆ and MANTIDÆ, were for some years in the hands of the late Mr. Robert Shelford, who was, however, unable to study them, owing to ill-health; and after his untimely death in 1912, they, too, were sent to Dr. Bolivar. Much gratitude is due to the veteran naturalist who, after repeated delays resulting from illness and pressure of his official duties as Director of the Natural History Museum of

As to the number of species*, it can with good reason be compared to that found in Madagascar, particularly if one leaves out of account the cosmopolitan species and those of frankly African origin, which are much more numerous in Madagascar than in the Seychelles. On the other hand, in these islands Oriental influence makes itself felt in the presence of the genus *Panesthia*, while *Deropeltis* and *Eustegasta*, genera so characteristic of the African fauna, are entirely absent.

Although the collecting done by the members of the Percy Sladen Trust Expedition has surpassed, in its admirable results, what might be expected from a single expedition, there is little doubt that further explorations will add other material, but, as I hope, they will cause no deviation from the generally Oriental aspect of this fauna.

It is remarkable that two tribes, which in Madagascar are represented by numerous species, are totally wanting: the *EPILAMPRINÆ* and the *PERISPHERINÆ*. The absence of the

Spain, has been able to complete the work, and to the Editors of the 'Annals and Magazine of Natural History' for publishing the report. To facilitate publication, I have carefully translated into English those parts of the manuscript written in French. I am also, with the author's consent, responsible for the lists of localities and notes on habits (when no collector's name is given, it may be taken that the 1908-9 specimens were collected by myself), and in some cases for notes on long series, of which it was only possible to send a sample to Dr. Bolivar. It is intended to place a first set, including *Types* of all new forms, in the British Museum, other examples being kept in the Cambridge University Museum and by Dr. Bolivar.—HUGH SCOTT.]

* [43 (or 44, if *Periplaneta truncata* be included), representing 19 genera. 28 species are here described as new to science. 36 species occur in the Seychelles proper, 22 of them being known only from those islands, while 3 of the genera also are not known from elsewhere. Of the 14 other species occurring in the Seychelles, 6 are almost cosmopolitan, 5 Oriental, 1 African, and 2 occur in certain of the other archipelagoes visited. These latter, *i.e.* the coralline, archipelagoes are inhabited by several wide-spread forms, but also by 7 species not hitherto found in the Seychelles, and 5 of these 7 are described as new: *Ischnoptera aldabrensis*, from Aldabra; *Operculea* (n. g.) *crassiceps*, from Cargados; *Margattea laxiretis*, from the Chagos; *Supella amœna* and *Delosia* (n. g.) *ornata*, from the Amirantes. Many of the species known only from the Seychelles occur solely in the damp endemic forests in the mountains; many, such as the small *Theganopteryx*, were beaten from living foliage, others, *e.g.*, *Desmosia alluandi*, from dead leaves still hanging on trees; the remarkable new genus, *Hololeptoblatta*, represented by 2 species, each confined to a single island, lives exclusively in the spaces between the bases of the leaves of endemic *Pandanus*, while occasional specimens of two other new species, *Blattella lineaticollis* and *Mareta depressiceps*, were also found in this peculiar but productive habitat (*qf.* footnote, p. 349).—H. S.]

latter tribe is particularly noteworthy ; in Madagascar it is represented by a great number of extraordinary insects, striking, above all, on account of their size and robust form.

On the other hand, the PHYLLODROMIINÆ present a greater development in the Seychelles than in Madagascar, and even if the genera *Chrastoblatta*, *Mallotoblatta*, *Allacta*, and *Loboptera* are wanting in the Seychelles, others not less interesting occur there. Among the latter are the new genera *Hololeptoblatta* and *Distichopsis* ; the first of these has the body completely flattened, and recalls certain Coleoptera (*Hololepta*) of the family HISTERINÆ, which live under the bark of trees, though these cockroaches live, not under bark, but in the narrow, water-holding interspaces between the bases of the leaves of certain endemic species of *Pandanus* ; the second, *Distichopsis*, might be thought from its general appearance to belong to the BLATTINÆ or PERISPHERIINÆ, near such genera as *Polyzosteria* or *Ateloblatta*, though actually its place is near *Loboptera*.

Those who are familiar with the difficulties of collecting the cockroaches of the genera *Blattella* and *Theganopteryx*, difficulties due to their small size, the swiftness of their movements, and the fragility of their integuments, should have occasion to admire the number and the usually good condition of the examples in this collection.

The 19 genera and 43 species enumerated are distributed as follows among the various tribes : ANAPLECTINÆ, 1 genus, 6 spp. ; PHYLLODROMIINÆ, 12 genera, 20 spp. ; BLATTINÆ, 2 genera, 3 spp. ; PANCHLORINÆ, 8 genera, 4 spp. ; PANESTHIINÆ, 1 genus, 1 sp. Since more than half the genera belong to the PHYLLODROMIINÆ, a key of these genera is given at the head of that tribe, on p. 320.

Anaplectinæ.

THEGANOPTERYX, Brunner.

1. *Theganopteryx scotti*, sp. n.

Nitida, nigra, staturâ parvâ. Caput vertice rufo. Antennæ pallidæ, tantum apicem versus infuscatae. Pronotum nigro nitidum, ubique anguste albo marginatum. Elytra angusta, abdomen distincte superantia, nigra, medio fasciâ transversâ interruptâ albidâ, campo marginali ante medium albescente, pallucido. Pedes albo nigroque variegati ; tibiae nigrae basi brevissime albæ ; tarsi albidii apice tantum fuscii. ♂.
Long. corp. 6 ; pron. 1·8 ; elytr. 4·5 mm.

Loc. Seychelles : Félicité Island, xii. 1908, 1 example.

Head blackish with vertex ferruginous. Pronotum transverse, rather angular at the posterior margin, shining black, hemmed all round with a narrow ivory-white border, which is slightly wider laterally and along the posterior margin; near the lateral margin is discernible a slight furrow, which makes the margin appear feebly reflexed. Elytra attenuated towards the extremity and exceeding the abdomen in length, shining black, ornamented towards the middle of their length with a lateral white mark; scapular area with its outer margin translucent and whitish, less so at the base; ulnar area traversed by numerous veins, very crowded and directed towards the apex of the elytron. Legs black with the extremity of the middle femora and base of the middle tibiae, the front tibiae entirely, and the basal segment of all the tarsi, white.

2. *Theganopteryx grisea*, sp. n.

Minuta, omnino pallidissime grisea. Caput stramineum, oculi fusci.

Pronotum postice obtusissime angulatum, disco stramineo, lateribus pellucidis, prope marginem subsulcatis. Elytra abdomen superantia, subhyalina, sparse griseo variegata. Pedes pallidi. Abdomen stramineum. ♂.

Long. corp. 4·5; pron. 1·2; elytr. 4·2 mm.

Loc. Seychelles: Mahé, forest above Cascade Estate, i. 1909, a single example in rather poor condition.

Head very pale yellow, eyes brownish. Pronotum pale, posterior margin very slightly angular, lateral margins almost transparent, with a very superficial furrow, which causes the margin to appear elevated, although it is in reality directed downwards. Elytra longer than the abdomen; scapular area very wide, branches of the ulnar vein directed towards the apex. The colour of the elytra is very pale grey and their surface is covered with very small brownish mottlings. Legs very pale, almost hyaline. Abdomen yellowish.

3. *Theganopteryx minuta*, sp. n.

Fusco-castanea, corpore ubique pallide marginato. Caput inter oculos fasciâ latâ pallidâ. Antennæ fuscae, basi pallidae. Pronotum disco fusco-brunneo, lateribus late pallide subpellucidis; margine antico angustissime pallide marginato. Elytra rufotestacea, nitida, campo antico pellucente, flavido, campo anali basique venæ radialis, necnon ramis venæ ulnaris, fuscis. Alæ subfuscae, campo marginali fusco, opaco, tantum antice anguste pallide marginato, areâ discoidali fenestratâ apicem versus

angustata, venis transversis 8-9 fuscis, venâ ulnari longe ante apicem furcata, campo apicali parvo. Pedes pallidi. Cerci pallidi, basi apiceque breviter infuscati. Lamina supra-analis truncata.

Long. corp. ♂ ♀ 4·5; pron. 1·2; elytr. 4·5-5 mm.

Loc. Seychelles: Silhouette, Mahé, Félicité. Silhouette: high forest near Mont Pot-à-eau, about 1500 feet, and Mare aux Cochons, over 1000 feet, viii.-ix. 1908. Mahé: high forests of Morne Blanc and Morne Pilot, above Cascade Estate, and Mare aux Cochons district, all about 1000-2000 feet. Félicité: from forest, xii. 1908. 30 examples; excepting one from the drier, less endemic type of forest near sea-level on Félicité, all are from the high endemic forests.

One of the smallest species of the genus. Of a fulvous brownish, with the disc of the pronotum almost black and its lateral margins broadly pale and subhyaline, the anterior margin narrowly bordered with yellow. Antennæ filiform, lighter at the base. Elytra longer than the abdomen, especially in the male, with the anterior field pale and the rest ferruginous brown, the branches of the ulnar vein straight, parallel, abutting on the extremity of the elytron and dark at the apex; the veins placed between them scarcely distinct, which makes the surface of the elytron look almost smooth. Wings smoky with the apical half of the anterior field almost black, furrowed on account of the elevation of the very numerous costal veins; anterior margin of the wing narrowly fulvous. The area formed by the radial vein and the vena spuria of Brunner is fairly broad before the middle of the wing, but narrows towards the extremity, and is traversed by a small number of brownish veins, some of which fuse in the form of a V. Ulnar vein bifurcated in its final third. Abdomen almost black with lateral margins narrowly pale above. Supra-anal lamina truncated at the extremity. Legs very pale. Cerci whitish, with base and extremity blackish.

4. *Theganopteryx lunulata*, sp. n.

Parva, ferruginea, nitida. Caput obscure ferrugineum, oculi tantum fuscii. Antennæ, basi exceptâ, fuscae. Pronotum testaceum, lateribus obsolete impressis, pellucidis, disco postice fasciâ latâ subarcuatâ, fuscâ, transversâ. Elytra ferruginea, versus marginem anticum pellucida. Alæ leviter infuscatæ. Abdomen fusco-caestaneum, anguste pallide marginatum. Pedes pallidi. Cerci, basi breviter fuscâ exceptâ, pallidi.

Long. corp. ♂ ♀ 5·3; pron. 1; elytr. 5 mm.

Loc. Seychelles : Silhouette, Mahé, Praslin, Félicité. Silhouette : high forests near Pot-à-eau and Mare aux Cochons, viii.-ix. 1908, 25 specimens. Mahé : forest above Cascade Estate, 1000-2000 feet, i.-iii. 1909, 2 specimens ; damp forest at summit of Morne Pilot, over 2000 feet, x.-xi. 1908. Praslin : Côtes d'Or Estate, xi. 1908. Félicité : from forest, xii. 1908, 1 example. As in the preceding species, all the material was collected in the high damp forests, excepting one specimen from the drier non-endemic forest on Félicité.

A very pretty species, as small as *Th. minuta*, but very bright ferruginous, with the head of the same colour, except the eyes, which are deep brown, and with the antennæ brownish, paler at the base. The ferruginous colour extends also on to the pronotum, but this presents in its posterior part a darker transverse band running along the central part of the hind margin ; this band, the width of which is almost a millimetre, does not extend on to the lateral margins ; these are of a lighter colour than the rest, and exhibit quite close to the edge a longitudinal furrow which causes the extreme edge to appear a little reflexed. Elytra longer than the abdomen in both sexes, reddish, lighter towards the margins, with the ulnar field traversed by numerous veins very close together. Wings slightly smoky. Legs wholly whitish-yellow. Abdomen brownish, darker on the disc, with the lateral margins of the segments narrowly yellow.

5. *Theganopteryx reticulata*, sp. n.

Th. minuta valde affinis, staturâ paullo majore ; fusco-nigra. Caput vertice fusco-rufescente. Pronotum disco nigro-castaneo, margine postico plus minuse, lateribus late, pallidis. Elytra corpus superantia, apicem versus distincte angustata, extus pellucida, minutissime griseo reticulata. Alæ infumatae. Pedes pallide fuscî. Tarsi neonon cerci, basi fuscâ exceptâ, pallidi. Long. corp. ♂ ♀ 5.5 ; pron. 1.8 ; elytr. 6.5-7 mm.

Loc. Seychelles : Silhouette, Mahé. Silhouette : from the high forests near Mont Pot-à-eau, about 1500 feet, and above Mare aux Cochons, viii.-ix. 1908. Mahé : highest and dampest forest on summit of Morne Pilot, over 2000 feet, xi. 1908 (six examples) ; high forest between Trois Frères and Morne Seychellois, 1500-2000 feet, xii. 1908, and from the slopes of the latter mountain, 1500-2000 feet, ii. 1909. 27 specimens in all, the majority from Mahé, and from the highest and most humid zones of endemic forest.

This species is a little larger and proportionally broader

than the preceding, and is sufficiently distinguished by its coloration, the head not being ornamented on the vertex with a transverse pale band, and the disc of the pronotum being almost black or deep chestnut, this dark colour reaching to the front margin and, more or less, to the hind margin, while the lateral margins are pellucid, a little whitish on the inner side, and wider; and it is especially differentiated by the elytra, the nervures of which are finely greyish, and anastomose one with another in such a way as to produce a reticulated appearance. The wings are smoky, with the ulnar vein simply forked in its apical third; all the veins of the anterior field are strongly infuscated, especially near the edge, where they form an opaque black band; the fenestrated part is traversed generally by eight perpendicular veins. The apical field scarcely passes beyond the general outer contour of the wing. Some lighter-coloured examples have the legs paler, scarcely infuscated at the extremities of the tibiæ and tarsi. The abdomen is almost black.

6. *Theganopteryx litturata*, sp. n.

Staturâ major, obscure ferruginea, nitidissima. Caput obscure ferrugineum, oculi tantum fusci. Antennæ, basi exceptâ, fuscæ. Pronotum disco fusco-nigro, utrinque lineâ flavâ angustâ marginato, lateribus late pellucidis. Elytra abdomen superantia, obscure ferruginea, margine costali pellucido. Alæ leviter infumate. Abdomen fusco-castaneum, anguste pallide marginatum. Pedes pallidi.

Long. corp. ♂ ♀ 6·2; pron. 1·5; elytr. 6·5-7 mm.

Loc. Seychelles: Mahé; high damp forest at summit of Morne Pilot, over 2000 feet, xi. 1908, 4 specimens; Cascade Estate, about 1000 feet, xii. 1908, 1 specimen; and one example without detailed record.

The biggest species of those known from the Seychelles; it differs from the others also by its more slender form, by its elytra being longer and very attenuated towards the extremity, by the bright sheen of the elytra, and finally by the pronotum having its disc very dark and limited laterally [at the commencement of the pale translucent lateral margins] by a yellow line. The elytra are very dark ferruginous with the marginal field transparent and a little yellowish, continuing along each side of the body the lateral pale border of the pronotum.

Phyllodromiinae.

Table of Genera known from the Islands under Review.

1. Elytra and wings well developed in both sexes.
2. Eyes separated at vertex, not contiguous.
3. Appendages of subgenital lamina in ♂ normal.
4. Ulnar vein of hind wings sending out branches to the apical margin and others to the dividing vein.
5. Extremity of abdomen normal. [Burm., p. 321.
- 5, 5. Extremity of abdomen closed by an opercular lamina. *Ischnoptera*, [gen. nov., p. 323.
- 4, 4. Ulnar vein of hind wings sending all its branches to the apical margin. *Operculea*,
6. The two sexes alike in form of body and development of organs of flight, or these latter are at the most a little shorter in the ♀.
7. Subgenital lamina of ♂ rounded or truncated at the end, sometimes sinuate or cloven, bearing the styles on the posterior margin.
8. Ulnar vein of hind wing simple or bifurcated, rarely three-branched; anterior femora provided on the anterior edge with a series of spines, of which the proximal are larger. [p. 324.
- 8, 8. Ulnar vein of hind wings three- or four-branched; femora provided with spines only at the base, or at the most to the middle, the apical half or third of the anterior edge being pectinated with very small and numerous spines or simply with spiniform hairs. *Blattella*, Caudell,
- 7, 7. Subgenital lamina of ♂ elongate, profoundly cloven in the middle into two divergent lobes which bear the styles on their inner margins. [p. 327.
- 6, 6. The two sexes unlike in form of body and development of organs of flight; ♂ elongate, with elytra much longer than abdomen; ♀ broad, with elytra not exceeding length of abdomen. *Murgattia*, Shelf,
- 8, 3. Appendages of subgenital lamina in ♂ abnormal, sometimes wanting on one side, bifid or trifid or transformed into organs of different forms. [p. 338.
9. Body of ordinary form; vertex more or less rounded transversely; eyes not prominent. *Marsta*, Bol.,
- 8, 3. Appendages of subgenital lamina in ♂ abnormal, sometimes wanting on one side, bifid or trifid or transformed into organs of different forms. [p. 337.
9. Body of ordinary form; vertex more or less rounded transversely; eyes not prominent. *Supella*, Shelf,

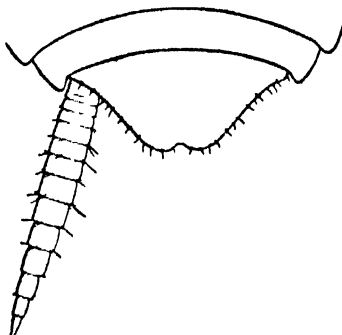
10. Supra-anal lamina in ♂ rounded behind; subgenital lamina more or less irregular at the hind margin [Bol., p. 389.
Onychostylus,
 [p. 338.
Delosia, gen. nov.,
 [gen. nov., p. 348.
Hololeptoblatta,
Desmosia, Bol.,
 [p. 333.
- 10, 10. Supra-anal lamina in ♂ rectangular, subgenital lamina broadly truncated or subsinuate.....
- 9, 9. Body extremely flattened; vertex broadly truncated; eyes prominent
- 2, 2. Eyes contiguous.....
- 1, 1. Organs of flight very short, rudimentary, or even absent; elytra usually horny, leaving the abdomen entirely or in great part uncovered.
12. Articulated elytra and wings present, though very much reduced
- 12, 12. ♂ with lobiform, non-articulated elytra; ♀ completely apterous [Sauss., p. 345.
Temnopteryx,
 [gen. nov., p. 345.
Distichopsis,

ISCHNOPTERA, Burm.

7. *Ischnoptera gardineri*, sp. n. (Figs. 1, 2.)

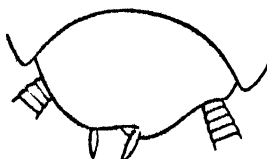
Corpus elongatulum, colore griseo-ferrugineo. Caput oblongum, unicolor, vertice inter oculos lineis castaneis longitudinalibus

Fig. 1.



Ischnoptera gardineri, sp. n., ♂; extremity of abdomen from above.

Fig. 2.



Ischnoptera gardineri, ♂; subgenital lamina.

vix distinctis. Antennæ graciles, concolores. Pronotum basi obtusissime angulatum, anticesubtruncatum, verticem subliberans,

marginibus lateralibus pone medium rotundatis, deinde antrorsum convergentibus, disco plano, ferrugineo maculato, lateribus deorsum sensim inflexis. Elytra abdomen valde superantia, pone medium distincte angustata, apice obtusa. Alæ fere hyalinæ, irideo micantes, campo antico apice valde angustato, leviter producto, areâ triangulari parvâ, elongatâ, venis costalibus flavescens, venâ mediâ atque venâ ulnari subcurvatis, propter hoc areâ intermediâ medio ampliâ et in tertiâ parte apicali angustissimâ, venâ ulnari ramos 4 vel 5 versus apicem, 3-4 versus venam dividens, emittente. Pedes pallide rufescentes, a basi fusco-maculati; femora antica spinis validis armata. Abdomen flavescens, disco ventrali obscuriori, castaneo. Lamina supra-analis magna, utrinque sinuata, medio rotundato-producta, apice breviter sinuata; subgenitalis convexa, apice irregulariter sinuata, stylis instructis.

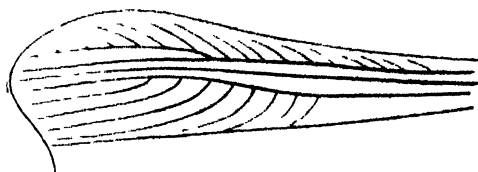
Long. corp. ♂ 14; pron. 3.8; elytr. 14 mm.

Loc. Seychelles: Praslin, 1905, 1 example (Gardiner).

8. *Ischnoptera aldabrensis*, sp. n. (Figs. 3-5.)

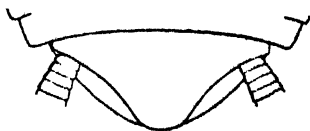
Parva, colore succineo. Vertex obtusus, rotundatus, castaneus. Frons pallida. Antennæ graciles, fulvæ. Pronotum rufum, antice truncatum, verticem leviter liberans, postice obtusissime

Fig. 3.



Ischnoptera aldabrensis, sp. n., ♀; anterior part of hind wing.

Fig. 4.



Ischnoptera aldabrensis, ♀; supra-anal lamina.

angulato-rotundatum, marginibus lateralibus angustissime reflexis, declivibus, antrorsum convergentibus. Elytra oblonga, apicem versus haud vel indistincte angustata, apice oblique

truncata; campo antico angusto; campo anali parum ante medium terminato. Alæ hyalinæ, venis fuscescentibus, venâ discoidali vix pone medium furcatâ, areâ anteriore flavescente, ramis costalibus gracilibus; venâ mediâ rectâ, venâ ulnari fere ante medium curvatâ, ramos 5 versus apicem, 2 versus venam dividendem, emittente. Pedes pallidi. Abdomen oblongum,

Fig. 5.



Ischnoptera aldabrensis, ♀; last ventral segment of abdomen.

latiusculum, postice rotundatum; cerci . . . ? Lamina supra-analis trigona, apice rotundata et utrinque sinuata. Segmentum ultimum ventrale amplum, convexiusculum, postice rotundatum, utrinque subsinuatum.

Long. corp. ♀ 11; pron. 3; elytr. 10.5 mm.

Loc. Aldabra, xi. 1908, 1 example (J. C. F. Fryer).

OPERCULEA, gen. nov.

Inter *Ischnopteram* et *Blattellam* genus insigne locandum. Vena ulnaris alarum ramos validiores versus apicem, ramos pauciores, tenues, versus venam dividendem, emittens; femora antica spinosa; abdomen apice operculatum.

GENOTYPE, *Operculea crassiceps*, sp. n.

9. *Operculea crassiceps*, sp. n. (Figs. 6-8.)

Pallide ferruginea. Caput crassum, vertice longitrorsus rotundato, inter oculos angusto, pallide flavescente, inter oculos maculâ

Fig. 6.



Operculea crassiceps, gen. et sp. n., ♀; extremity of abdomen from above, showing supra-anal lamina.

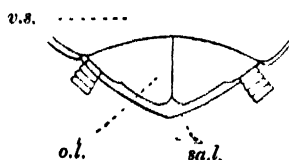
transversâ fuscâ. Antennæ palpique pallide rufescentes. Pronotum postice obtusissime angulato-rotundatum, antice subtruncatum, verticem vix liberans, disco rufescente, lateribus deflexis

pallidioribus, angustissime marginatis. Elytra lanceolata, abdomen superantia, apice obtuse rotundata. Alæ hyalinæ, fusco venosæ, campo antico apice vix producto, areâ triangulari minutâ, sinuatâ, venâ discoidali pone medium furcatâ, venis costalibus leviter incrassatis, flavescentibus, venâ ulnari ramos 4 versus apicem, 3-4 versus venam dividentem, emittente, venâ axillari ramosâ. Pedes pallidi; femora antica subtus spinis validis

Fig. 7.

*Operculea crassiceps*, ♀; last ventral segment.

Fig. 8.



Operculea crassiceps, ♀; extremity of abdomen from beneath. *sa.l.*, supra-anal lamina; *o.l.*, opercular lamina; *v.s.*, last ventral segment. [In fig. 8 the specimen is tilted so as to show the opercular lamina, and consequently the outline of the last ventral segment appears very different from that in fig. 7.]

regulariter armata. Lamina supra-analis ♀ obtuse triangularis; segmentum ultimum ventrale fornicatum, postice rotundatum; apertura analis valvulâ instructa. Cerci . . . ?
Long. corp. ♀ 11; pron. 2.6; elytr. 11 mm.

Loc. Cargados Islands: Establishment Island, 1905, 1 example (*Gardiner*).

BLATTELLA, Caudell.

10. *Blattella germanica* (L.).

Blatta germanica, L., Syst. Nat., ed. xii. i. p. 668 (1767).

Loc. Chagos Is.: Salomon Atoll, 1905, one specimen. Seychelles: Bird I., vii. 1908, 2 immature examples. Also several specimens taken on H.M.S. 'Sealark,' 1905.

A cosmopolitan species, found principally in the Old World.

11. *Blattella lobiventris* (Saussure).

Blatta lobiventris, Saussure, Ann. Mus. Nat. Genova, ser. 2, xv. (xxxv.) p. 73 (1895).

Loc. Seychelles: Long Island, vii. 1908, 3 specimens; Mahé, from near Morne Blanc, about 1000 feet, xi. 1908, 1 example, and 1 specimen from the coastal plain at Anse aux Pins or Anse Royale, i. 1909.

This species, first found at Scioa (Shoa, East Africa), was rediscovered in Abyssinia, and redescribed by Adelung (*Blattodées rapp. par M. le Cap. G. W. Kachovski de l'Abyssinie Méridionale*, in Ann. Mus. Zool. Ac. Sci. St. Petersburg, 1902). I cannot be quite certain that the examples from the Seychelles are identical with those from Abyssinia, on account of the well-known difficulty of determining insects without direct comparison.

It is without doubt by error that de Saussure assigns to the "écusson répugnatoire" the place of the sixth dorsal abdominal segment, since it occupies the seventh segment, as indeed Adelung has already shown. The ♂ from the Seychelles examined by me has the supra-anal plate a little longer than broad, in the form of a triangle rounded at the extremity. De Saussure and Adelung do not appear to have known the ♂ of this species. The ♀ has the supra-anal plate in the form of a triangle little drawn out, much broader than long and rounded at the apex. This species should be very close to *madecassa*, Saussure, the size of which is scarcely any smaller.

12. *Blattella similis*, sp. n.

B. germanica staturâ maior, fulvo-testacea. Caput prominulum, nigrum, ante oculos lineâ angustâ transversâ pallidâ, lateribus capituli neonon labre palpisque flavescentibus. Pronotum (♀) transversum, postice truncatum, lateribus rotundatis, antrorsum convergentibus, caput subliberans, disco nigro bifasciato, spatio medio fulvo, latiusculo, fasciis nigris medio intus extusque dilatatis, antice marginem attingentibus, postice abbreviatis. Elytra pallide ferruginea, abdomen superantia, venâ mediastinâ anguste nigrâ. Alæ venis fuscis, venâ discoidali rectâ, venâ ulnari ramosâ, ramis crassis, curvatis, versus apicem alarum ductis; venâ axillari 5-ramosâ. Pedes pallidi; femora antica spinâ apicali armata, subtus fere inermia, tantum prope apicem spinâ parvâ; femora quatuor posteriora valde spinosa; tibiæ omnes basi et apice breviter infuscatæ; articuli tarsorum fusco terminati. Abdomen superne infuscatum, subtus dilutius. Cerei angusti, basi fusciores, dimidio apicali fusco-marginati. Lamina

supra-analis ♀ trigona, producta, apice rotundata, fusca, lineâ mediâ anguste griseâ. Segmentum ultimum ventrale latum, rotundatum, medio subcarinatum, castaneum.
 Long. corp. ♀ 10; pron. 2·5; elytr. 11·5 mm.

Loc. Seychelles: Mahé, Cascade Estate, about 1000 feet, i. 1909, one specimen, and a second without record of exact locality; Silhouette, viii. 1908, one specimen.

13. *Blattella bisignata* (Brunner).

Phyllodromia bisignata, Brunner, Rev. Syst. Orthopt. (Ann. Mus. Genova, xxxiii.) p. 15, pl. i. fig. 1 (1893).

Although I find some differences between the single example which I have been able to examine and the original description, as well as that given by de Saussure (Orthopt. de Madagascar, p. 28, 1895), yet I think that the specimen from the Seychelles which occasions these lines can be considered as merely a variety. The differences can be appreciated from the following short diagnosis:—

Blattella germanica similima, sed minor, fulvo-testacea; vertice inter oculos fasciâ latâ, transversâ, fuscâ, antice lineâ pallidâ, arcuatâ, circumscripto; fronte fuscâ, maculis duabus pallidis magnis ornatâ; pronoti lineis nigris antice posticeque abbreviatis, spatio intermedio angusto, rufescente; elytris pellucidis, suaviter ferrugineis, haud tessellatis, campo anali angusto, elongato, fere usque ad medium elytrorum producto; alis dilute infumatis, fusco venosis, venâ ulnari uni-ramosâ; pedibus testaceis, femoribus anticis spinis basalibus necnon spinâ subapicali majoribus, intermediis parvis; laminâ supra-anali ♀ transversâ, medio triangulariter productâ, apice obtusâ; cercis latiusculis, fuscis; abdomine inferne lateribus infuscatis, margine immo anguste pallido.

In the time of the late Mons. de Saussure, I received from him various examples of a *Blattella*, taken in Java, under the name *bilineata*, but which I believe to be that named by Brunner *bisignata*. Specimens of this same species from the Philippine Is. are also in my possession. These places, and Burma (whence the species was originally described) are the only localities whence *bisignata* was hitherto known. Thus the new locality of Mahé, Seychelles, is an important addition to its known range.

Loc. Seychelles: Mahé; Port Victoria, xii. 1908, one specimen (almost certainly from non-endemic vegetation).

14. *Blattella lineaticollis*, sp. n.

Colore pallide fulva. Caput valde depressum, vertice propter hoc acutiusculo, lato, anguste fusco, antice fasciâ transversâ pallidâ et inter scrobas antennarum infuscato. Pronotum transversum, lateribus late pellucidis, postice truncatum, marginibus lateralibus arcuatis, disco rufescente, utrinque lineâ angustissimâ fuscâ a margine antico pone oculos nascente et ante marginem posticum abbreviatâ. Elytra lanceolata, abdomen superantia, fulva, tantum basi lineâ humerali, brevi, nigrâ; campo auali cordiformi, parum ante medium elytrorum terminato, venis parvis parum elevatis, crassiusculis. Alæ suavissime infumatæ, campo antico apice leviter producto, margine antico (præcipue inferne) angustissime flavo, venis brunneis, ramis costalibus numerosis, parallelis, apice subincrassatis, venâ discoidali rectâ, venâ ulnari 4-ramosâ, areâ triangulari parvâ, venâ axillari 3-ramosâ, ramo medio longe ante apicem furcato. Abdomen subtus medio et lateribus fasciâ fuscâ, longitudinali, diffusâ, ornatum. Segmentum ultimum ventrale ♀ magnum, postice angustato-rotundatum et medio breviter sinuatum, medio longitrorsus carinatum.

Long. corp. ♀ 9; pron. 2.1; elytr. 9 mm.

Loc. Seychelles: Mahé; from between bases of leaves of a growing endemic palm (*Verschaffeltia*), near Morne Blanc, 1908, 1 example; from between bases of leaves of a growing endemic *Pandanus*, same place and date, 3 specimens.

This insect is very characteristic and well differentiated from the numerous species with pronotum ornamented with longitudinal black lines or bands. In the ramose ulnar vein of the hind wings it belongs to the true *Phyllodromia* of de Saussure (Orthopt. Madagascar), and in the disposition of the spines of the anterior femora it should be placed beside *adversa**, but in the present species the longitudinal veins of the anterior field have a normal disposition, and are not curved in the middle as in *adversa*. *B. lineaticollis* is a very pretty species, of which I have only seen the female.

MARGATTEA, Shelford, Ent. Mo. Mag. xlvii. p. 155 (1911).

15. *Margattea laziretis*, sp. n.

Pallide straminea. Caput pallidum, vertice inter oculos fusco lineato, fronte maculis parvis fuscis ornata. Antennæ pallidæ. Palporum maxillarium articulus ultimus pænultimo distincte

* *Blatta adversa*, Sauss. (Orth. Madag. pp. 27, 33, 1895), was described from Java. The specific name is misprinted *advena* by Kirby, Cat. Orth. i. p. 91 (1904).

brevior, basi tantum fuscus. Pronotum transversum, postice truncato-subrotundatum, marginibus lateralibus antrosum sensim convergentibus, late pellucidis, disco lineis parvis irregulariter signato, margine postico inter humeros fusco limbato. Elytra corporis extremitatem superantia, tote pellucida, griseo reticulata, campo antico latiusculo, campo discoidali suaviter ferrugineo. Alæ hyalinæ, prope marginem anticum flavescentes, venis costalibus apicem versus incrassatis, fuscis, ultimis ramosis, areâ ulnari areâ marginali latiore, venâ ulnari 4- vel 5-ramosâ, areâ triangulari parvâ, venâ axillari ramosâ. Pedes ferruginei; coxæ basi fusco notatæ; femora antica spinis parte proximali minutis, pone medium spinis duabus magnis; femora intermedia et posteriora regulariter spinosa, spinis longis inter se valde distantibus; tibiæ spinis basi puncto nigro apposito. Abdomen pallidum, subtus medio utrinque dilute fusco marmoratum. Cerci bicolores, basi et annulo pone medium et apice nigris. Lamina supra-analis ♂ trigona, apice obtusata atque breviter excisa. Lamina subgenitalis transversa, apicem versus attenuata et apice profunde bisinuata, lobo medio producto, obtuso, lobis lateralibus acutiusculis, extus subsinuatis, stylis brevibus.

Long. corp. ♂ 10; pron. 2.2; elytr. 12 mm.

Loc. Chagos Is.: Salomon Atoll (*Gardiner*, 1905), 1 ♂.

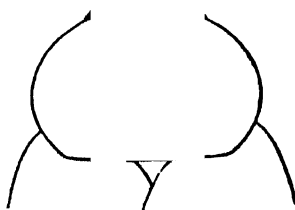
This, again, is a species which should be placed near *B. adversa*, Sauss., but which differs from it in much the same way as from *longicercata*. It presents a very characteristic livery in consequence of the little black marks on its legs and especially on its cerci, which have the base, a ring beyond the middle, and the penultimate and terminal segments black. The tibiæ are ornamented with a black point at the base of the spines and a black mark at the apex. The whitish reticulation of the elytra is also remarkable; it is formed principally by the transverse veins, each of which is traversed by a very fine greyish line. The subgenital lamina exhibits a singular conformation, being transverse and attenuated towards the apex, where it is bisinuate and forms three lobes, of which the median is triangular and obtuse, while the lateral, more prolonged and slender at the apex, bear the styles, each placed in a little sinus on the outer side.

16. *Margattea crassivenosa*, sp. n. (Figs. 9, 10.)

Ferrugineo-fusca. Caput antice rotundatum, inter oculos latiusculum, infuscatum, antice lineâ pallidâ parum distinctâ, fronte convexâ subindistincte maculatâ. Antennæ fuscae, basi pallidiores. Pronotum transversum, antice posticeque truncatum, lateribus rotundatum, caput liberans, disco indistincte fusco variegato, lateribus pellucidis. Elytra lanceolata, apice parum angustata, abdomen modice superantia, griseo-ferruginea, extus pellucida,

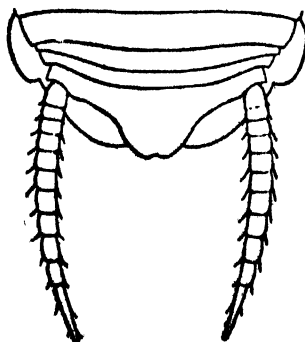
griseo venosa, venis transversis elevatis. Alæ dilute infumatae, venis crassis fuscis, costalibus apicem versus sensim incrassatis, inferne valde fornicatis, nigris; venis longitudinalibus rectis, tantum ante apicem subindistincte curvatis; venâ ulnari 4-ramosâ, ramo primo fere ante medium alarum emisso; areâ triangulari parvâ, hyalinâ; venâ axillari 3-ramosâ, ramo intermedio furcato. Pedes pallidi vel fusci, spinis pallidis, trochanteribus fusco-nigris; femora antica margine antico spinis basalibus raris, majoribus, distalibus minutis. Abdomen superne castaneo-nigrum, subtus dilutius, apice infuscatum. Cerci nigri, articulo ultimo longissimo, acuto, pallido. Lamina supra-analis trigonalis, lineâ griseâ longitudinali ornata, basi transversa, apice producta, obtusata atque breviter sinuata. Segmentum ultimum ventrale medio subsulcatum, margine postico utrinque sinuato, medio breviter exciso, maximâ parte nigrâ. ♀. Long. corp. 11; pron. 3; elytra 11.5 mm.

Fig. 9.



Margattea crassivenosa, sp. n., ♀; anterior part of body from above.

Fig. 10.



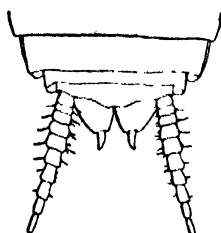
♀; extremity of abdomen from above.

Loc. Seychelles: Silhouette; Mare aux Cochons, over 1000 feet, ix. 1908, 2 examples; and a third, without exact record.

17. *Margattea parvula*, sp. n. (Figs. 11, 12.)

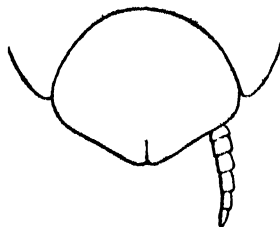
Parva, pallide ferruginea. Caput depressiusculum, vertice rotundato, a supero viso parum distincte castaneo lineato, inter oculos lato, antice maculis duabus castaneis. Antennæ pallidæ. Pronotum parvum, transversum, basi recte truncatum, disco pallide rufescente, lateribus pellucidis, marginibus antrorsum sensim convergentibus. Elytra abdomen haud multo sed distincte superantia, apicem versus parum angustata, areâ mediastinâ pellucidâ, intus subsinuata, campo anali longe ante medium terminato. Alæ hyalinæ, campo antico obtusè angulatim

Fig. 11.



Margattea parvula, sp. n., ♂; extremity of abdomen seen from above.

Fig. 12.



Margattea parvula, ♀; last ventral segment.

rotundato-producto, areâ triangulari parvâ, venis flavescentibus, rectis, venâ uluari atque venâ axillari triramosis. Pedes pallidi, femoribus anticis spinâ apicali magnâ instructis, margine antico ante medium spinis majoribus denique spinis minutis, prope apicem spinâ validâ, metatarso articulis reliquis tarsorum simul sumptis parum longiore. Abdomen pallidum. Cerci acutissimi. Lamina supra-analis ♂ postice obtuse producta, medio haud vel indistincte sinuata; lamina subgenitalis rotundata, medio plicato-excisa, stylis instructis. Lamina supra-analis ♀ transversa, subtrigona, vix producta. Segmentum ultimum ventrale

magnum, transversum, postice late rotundatum, utrinque subsinuatum, medio haud excisum, breviter et obsolete carinatum. Long. corp. ♂ ♀ 10; pron. 2; elytr. 8 mm.

Loc. Seychelles, Aldabra. Seychelles: Mahé, Cascade Estate, about 1000 feet, i. 1909, 2 examples; Long Island, vii. 1908, 2 specimens. Aldabra: x.-xi. 1908, 8 examples (Fryer).

The organs of flight surpass the extremity of the abdomen by $1\frac{1}{2}$ mm. The eyes are separated by a space of almost $\frac{1}{2}$ mm., which allows this species to be distinguished easily from the following, the eyes of which are more approximated. The longitudinal lines on the vertex are only clearly distinguishable in individuals with well-developed coloration, while, on the other hand, the markings of the upper anterior part of the head can be discerned in all the individuals referable to the species.

Var. Pallidissime straminea, fere nivea.

Loc. Farquhar Atoll, 1905, 13 examples (Gardiner).

18. *Margattea longicercata*, sp. n. (Fig. 13.)

Straminea. Caput omnino pallidum vel maculâ transversâ, fuscâ, inter oculos; vertice angusto. Pronotum valde transversum, lateribus declivibus late pellucidis, disco flavescens, vel uniformiter griseo, basi late truncatum, marginibus lateralibus antrorsum convergentibus, angustissime marginatis, antice subtruncatum, verticem liberans. Elytra præcipue in ♂ abdomen superantia, apice obtuse angustata, campo antico campo postico haud angustiore, pellucens. Alæ hyalinae, flavescens-venosae; venâ discoidali atque venâ mediâ rectis, venâ ulnari 5-ramosâ, prope basin incurvatâ. Pedes pallidi; femora antica spinis margine anteriore minutissimis, prope basin parum majoribus. Abdomen concolor. Lamina supra-analis ♂ transversa, medio parum dilatata, apice truncato-submarginata. Lamina subgenitalis usque ad apicem latiuscula, medio fissâ, lobis productis, in margine externo stylis instructis. Lamina supra-analis ♀ medio excisa. Segmentum ultimum ventrale ♀ postice late rotundatum, utrinque subsinuatum, postice medio brevissime fissum, subproductum. Cerci graciles, depressiusculi, acuminati, valde elongati.

Long. corp. ♂ 9; pron. 2.8; elytr. 10.5 mm.

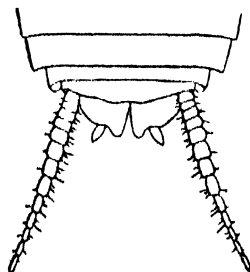
" " ♀ 11; " 2.2; " 9.5 "

Loc. Seychelles, Coetivy, Amirantes, Farquhar, Caradua, Aldabra. Seychelles: Bird I., vii. 1908 (Fryer); Long I., vii. 1908; Silhouette, from near Mout Pot-à-eau,

from Mare aux Cochons, and from cultivated country near the coast, viii.-ix. 1908; Mahé, Port Victoria, xii. 1908, and marshes on coastal plain near Anse Royale, i. 1909; Anonyme I., 9.i. 1909. Coetivy, 1905 (*Gardiner*). Amirantes: Desroches, Darros, and Eagle Islands, 1905 (*Gardiner*). Cargados, 1905 (*Gardiner*). Farquhar Group: Farquhar Atoll and Providence, Cerf I., 1905 (*Gardiner*). Aldabra; Takamaka and Ile Michel, xi. 1908 (*Fryer*). About 27 examples in all, from all the archipelagoes visited except the Chagos; in the Seychelles proper, found largely in cultivated islets or places near the coast*.

The example from Coetivy examined has a big dark brown patch on the vertex between the eyes. Those from Aldabra and from Farquhar differ by their slightly smaller size, also by the lesser development of the organs of flight in the ♀:

Fig. 13.



Margattea longicercata, sp. n., ♂; extremity of abdomen from above.

length of body, ♀, 7.5-8.5 mm.; elytra, 8 mm. Lastly, there is a variety from Mahé and Silhouette of still smaller size, the vertex being ornamented with longitudinal ferruginous lines in the Mahé specimens or with two longitudinal dark bands extending from vertex to epistome in those from Silhouette: length of body, ♀, 8 mm.; elytra, 7.5 mm.

Despite all these differences of size and coloration in the series assembled under the name *longicercata*, they always possess features in common which justify their assemblage and allow of their being distinguished from the preceding species. These are, firstly, the narrowness of the vertex

* [An additional series of 15 examples, formerly preserved in alcohol, would appear to be referable to this species; 12 are from Providence, Cerf I., 8.x. 1905, and 3 from Amirantes, Desroches I., 15.x. 1905—a further indication of the abundance of this insect.—H. S.]

between the eyes, the vertex being at this point no wider than the eyes seen from in front, while in *parvula* it is one-half as large again, although the size of the insect is smaller; secondly, the elytra are broader, having the anterior field as broad as the posterior part; moreover, the cerci are distinctly longer and more slender, and the last ventral segment of the ♂, though having fundamentally the same form as in *parvula*, is cloven in the middle, and its lobes are each prolonged into a prominent apex, bearing the style on its outer margin. These two species might be placed near *fissa*, Sauss., from Madagascar, but differ from it in the form of the last ventral segment (♀) and in their coloration.

DESMOSIA, Bolivar.

19. *Desmosia alluaudi*, Bolivar, Ann. Soc. Ent.
France, p. 371 (1895).

Loc. Seychelles: Silhouette, Mahé, Long Island. Silhouette, many specimens from the forests near Mont Pot-à-cau and Mare aux Cochons, 1000–2000 feet, viii.–ix. 1908. Mahé: from near Morne Blanc and Cascade Estate. 36 examples: this species was generally distributed in the mountain forests of Mahé and Silhouette, and was taken throughout the months of the 1908 expedition, namely, August to March. Three immature examples from Long Island, vii. 1908, are also referred to it. The adults were often found among still hanging dead leaves in the forests. The species was first discovered by Alluaud in Mahé in 1892.

MARETA, Bolivar.

20. *Mareta innotabilis* (Walker).

Blatta innotabilis, Walker, Cat. Derm. Salt. B.M. v., Suppl. Blatt.
p. 21 (1871).

Mareta conspectienda, Bolivar, Ann. Soc. Ent. France, p. 371 (1895).

Loc. Seychelles: Praslin, La Digue, Anonyme and Long Islands. Praslin: 1892 (*Alluaud*), and one example taken by Gardiner in 1905. La Digue: 1892 (*Alluaud*). Ile Anonyme, i. 1909, 1 specimen, and Long Island, vii. 1908, 2 specimens (these localities are two small cultivated islets off the coast of Mahé).

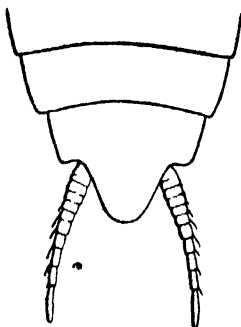
It would not have been easy to recognise this species from the description of Walker alone, but Kirby was able

to distinguish it by examination of the type. I named the insect *M. conspicienda* when describing it as a new species. It is known only from the Seychelles.

21. *Mareta depressiceps*, sp. n. (Figs. 14-16.)

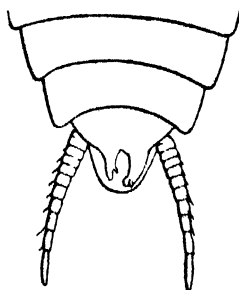
Fulva, fere unicolor, nitida. Caput valde depressum, vertex depresso, antice transverse subcarinato, dilute castaneo, inferne

Fig. 14.



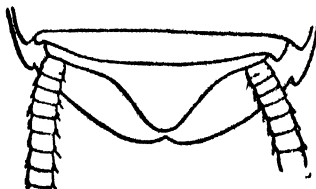
Mareta depressiceps, sp. n., ♂; extremity of abdomen from above.

Fig. 15.



Mareta depressiceps, ♂; extremity of abdomen from beneath.

Fig. 16.



Mareta depressiceps, ♀; extremity of abdomen from above.

inter scrobas antennarum lævi, plagâ pallidiore, fronte stramineâ. Antennæ pallide flavescentes. Pronotum transversum atque transverse convexiusculum, antice breviter, postice late, truncatum, lateribus late pellucidis, arcuatis, antrosum parum angustatum. Elytra (præcipue in ♂) abdomen superantia, apicem versus parum angustata, margine externo pellucido. Alæ dilute rufescentes, venis concoloribus, parte anticâ obtuse et parum productâ, campo antico angusto, venis costalibus brevibus, apice vix ampliatis, venis longitudinalibus rectis, venâ ulnari 4-ramosa. Pedes pallidi, femoribus anticis margine antico pone medium spinis parvis pectinato, spinis basalibus majoribus, paucis, metatarso postico articulis sequentibus simul sumptis longiore. Abdomen inferne disco plus minusve infusato vel fusco. Cerci graciles, acuti, fusci, apicem versus dilutiores, apice pallidi. Lamina subgenitalis ampla, postice late rotundata, medio breviter sinuata, in ♂ apice fissa, lobis apice intus sinuatis, stylis magnis.

Long. corp. ♂ 9.5; pron. 2; elytr. 10 mm.

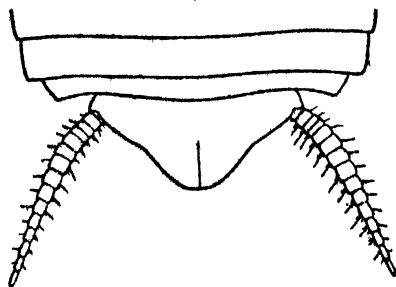
" " ♀ 11.5; " 2.3; " 11 "

Loc. Seychelles: Silhouette, Mahé, Anonyme Island. Silhouette: forests near Mont Pot-à-eau, over 1000 feet, viii. 1908; plateau of Mare aux Cochons and forest above, over 1000 feet, ix. 1908. Mahé: near Morne Blanc, about 1000 feet, xi. 1908 (including one specimen taken from between bases of leaves of a growing *Pandanus*); Cascade Estate, ii. 1909; and other localities. Anonyme Island (a small coconut-planted islet near Mahé), 9. i. 1909. About 88 examples in all.

22. *Mareta acuticerca*, sp. n. (Figs. 17, 18.)

Elongata; fulva. Caput depressum, antice fuscum, vertice inter oculos castaneo, nigro, nitido, inter scrobas antennarum lineâ

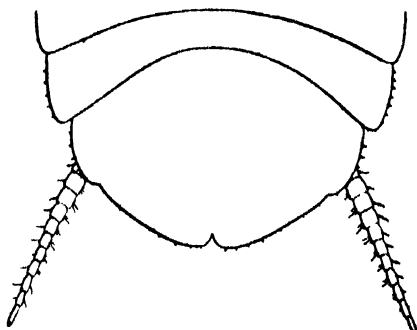
Fig. 17.



Mareta acuticerca, sp. n., ♀; extremity of abdomen from above.

rectâ, angustâ, eburneâ. Antennæ ferrugineæ. Pronotum distincte transversum, antice breviter, postice late, truncatum, lateribus pellucidis, curvatis, antrorsum convergentibus, caput liberans. Elytra abdomen superantia, lanceolata, ferruginea, extus pallidiora, margine interno ante medium subsinuata, areâ costali latiusculâ, dimidiam latitudinem elytrorum occupante. Alæ fere hyalinæ, parte anticâ dilute flavescente, apice producto; venis costalibus ferrugineis, apicem versus subdilatatis; areâ mediâ pallucidâ, venis longitudinalibus rectis, venâ ulnari 4- vel 5-ramosâ; venâ axillari ramosâ. Pedes pallidi, femoribus anticis margine anteriore pone medium spinis minutis pectinato, ante medium spinis longioribus armato; articulo primo tarsorum posticorum articulis sequentibus simul sumptis multo longiore.

Fig. 18.



Mareta acuticerca, ♀; extremity of abdomen from beneath.

Abdomen superne testaceum; cerci graciles, apicem versus angustati, acuti. Lamina supra-analis ♀ trigona, transversa, apice obtusata, medio carinata. Segmentum ultimum ventrale ♀ amplum, transversum, postice rotundatum, et medio subexcisum. Lamina subgenitalis ♂ trigona, parum elongata, medio fissa, lobis intus ante apicem sinuatis, stylis instructis.

Long. corp. ♂ 9; pron. 2.2; elytr. 10 mm.

" " ♀ 12; " 2.5; " 10.5 "

Loc. Seychelles: Silhouette, Mahé, Félicité. Silhouette: near Mont Pot-à-eau, and Mare aux Cochons plateau or forest near by, over 1000 feet, viii.-ix. 1908. Mahé: Forêt Noire District, x.-xi. 1908; Mare aux Cochons District, 1000-2000 feet, i.-ii. 1909; Cascade Estate, 800-1000 feet, i. 1909. 16 specimens in all.

SUPELLA, Shelford.

23. *Supella supellectilium* (Serville).

Blatta supellectilium, Serville, Ins. Orth. p. 114 (1839).

Loc. One example found on board H.M.S. 'Sealark,' while anchored off Eagle Island, Amirantes group, 1905 (*T. Bainbrigge Fletcher*).

A species which may be considered cosmopolitan.

24. *Supella amæna*, sp. n.

Albido-flavescens, fere hyalina. Caput inter oculos maculâ fuscâ, antice furcatâ, inter antennas maculâ magnâ, pallidâ, anguste fusco marginatâ. Antennæ fuscæ, basin versus pallidæ, crassiusculæ. Oculi nigri. Pronotum verticem leviter liberans, subtransversum, antrorsum sensim angustatum, antice quam postice angustius, lateribus late pellucidis, disco pallido, rotundato, nigro circumdato, limbo nigro marginibus antico posticoquo inoludentibus, postice utrinque breviter producto. Elytra campo antico lato, quam postico parum angustiore, ramis discoidalibus obliquis, maximâ parte in marginem posticum excurrentibus, subhyalina, fasciâ latâ fusco-nigrâ, in maculas duas solutâ, marginem anticum haud attingente. Alæ hyalinæ, campo antico, præcipue apicem versus, lato; venâ ulnari ramis 4 fusciscentibus divisâ, areâ apicali parvâ, haud productâ; campo antico apice rotundato, producto; venâ axillari primâ apice indivisâ, retrorsum curvatâ. Pedes pallidi. Abdomen lateribus supra subtusque, et segmentis apicalibus dorsalibus, fuscis, connexivo pallide fusco variegato.

♂. Antennæ distincte incrassatæ, hirsutæ. Elytra apicem abdominis valde superantia, maculâ fuscâ basali nigrâ, secundâ minore. Lamina supra-analis trigona, transversa, parum producta.

♀. Antennæ filiformes, haud hirsutæ. Elytra apicem abdominis tantum attingentia, maculâ secundâ usque ad apicem elytrorum extensâ.

Long. corp. ♂ 10; pron. fere 2·5; elytr. 10 mm.

" " ♀ 8; " " 2·5; " 6·2 "

Loc. Amirantes: Desroches I., 1905, 5 examples (*Gardiner*).

I place this species in the genus *Supella*, Shelford (Ent. Mo. Mag. (2) xxii. 1911, p. 155), on account of its remarkable sexual dimorphism. I must record, however, that it has the hind wings provided with a triangular apical field. This triangular field or area is scarcely, if at all, produced,

and the margin of the wing forms at this point a sinuosity, on account of the anterior field being strongly produced, although rounded at the extremity.

DELOSIA, gen. nov.

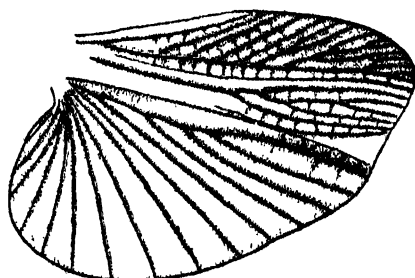
Corpus elongatum. Caput crassum. Oculi distantes. Antennæ filiformes, breviter villosæ. Pronotum nitidiusculum, verticem vix liberans, postice obtusissime angulatum et fere recte truncatum, disco trapezoidali, lateribus declivibus subpellucidis. Elytra abdomen parum superantia. Alæ venâ discoidali haud divisâ; venâ ulnari pone medium ramosâ, ramis apicem versus ductis; areâ triangulari fere nullâ; venâ axillari ramosâ. Pedes spinosi. Lamina supra-analis ♂ rectangulariter transversa, angulis liberis rotundatis. Cerci . . . ? Lamina subgenitalis versus apicem angustata, apice deflexa. Styli diversiformes. Statura parva.

GENOTYPE, *Delosia ornata*, sp. n.

25. *Delosia ornata*, sp. n. (Figs. 19–21.)

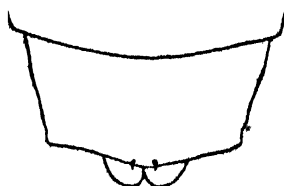
Statura parva. Caput castaneum, inter scrobas antennarum fasciâ transversâ, rufescente, ornatum. Antennæ rufescentes. Pronotum antice breviter truncatum, disco castaneo, anguste

Fig. 19.



Delosia ornata, gen. et sp. n., ♂; hind wing.

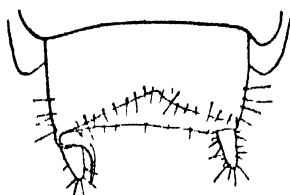
Fig. 20.



Delosia ornata, ♂; extremity of abdomen from above.

eburneo circumdato, lateribus oblique deflexis, rotundatis, antrorsum suaviter convergentibus. Elytra castanea, subnitida. Alæ dilute infusæ, fusco venosæ, venâ discoidali integrâ, ramis costalibus fuscis, venâ mediâ rectâ, tantum prope apicem distinctâ, venâ ulnari pone medium ramosâ, ramis 5 versus apicem emittente, areâ triangulari minutâ, hyalinâ, venâ axillari 5-ramosâ, ramo primo fere juxta axillam emisso. Pedes pallido testacei. Abdomen pallidum, subtus dilute castaneum.

Fig. 21.



Delonia ornata, ♂; extremity of abdomen from below.

Lamina supra-analis apice breviter deflexa, lateribus subsinuata. Lamina subgenitalis transversa, apice truncata vel subsinuata, stylo sinistro perfecte explicato, conico, crassiusculo, intus basi spinâ magnâ, arcuatâ, armato.

Long. corp. ♂ 9; pron. 2; elytr. 8 mm.

Loc. Amirantes: Ile Desroches, 15. x. 1905, 1 ♂ (*Gardiner*).

ONYCHOSTYLUS, Bolivar.

26. *Onychostylus gardineri*, sp. n.

Pallide fulvus. Caput vertice lineis duabus longitudinalibus, articulo apicali palporum (apice albido excepto) necnon articulis 2 et 3 antennarum, fusco-nigris. Pronotum ubique angustissime nigro marginatum, a latere pallide limbatum, disco fulvo, utrinque nigro litturato, litturâ nigrâ plus minusve extensâ, intus sinuatâ. Elytra fulva, areâ scapulari pallidiore, venâ mediastinâ strigâ nigrâ appositâ. Alæ hyalinæ, ramis radialibus apice brunneis; venis campi analis apicem versus brunneis. Pedes pallide testacei; femorum margine inferiore præcipue ad apicem, spinis tibiarum necnon articulo primo tarsorum apice, fusco-nigris. Abdomen fusco-nigrum, supra subtusque segmentis singulis utrinque maculâ pallidâ. Cerci pallidi, fusco variegati.

Long. corp. ♂ 16; pron. 4.5-5.5; elytr. 14 mm.

" " ♀ 17; " 4.8-6; " 13.5 "

Loc. Seychelles. Silhouette: 2 specimens, one from the forest near Mont Pot-à-eau, about 1500 feet, the other from Mare aux Cochons, over 1000 feet, viii.-ix. 1908. Mahé: 5 specimens without detailed records, and 4 others from forest in the Forêt Noire district, x.-xi. 1908, two of these being specially recorded as from leaves of *Pandanus hornei* in the high forest (not, however, from between the leaf-bases, as is the case in *Holeleptoblatta*).

27. *Onychostylus badius*, sp. n.

Magnus, latiusculus, colore badio. Caput crassum, totum fuscum vel antice infuscatum, fronte lineis duabus lateralibus, ante labrum convergentibus, nigris. Antennæ unicolores, rufescentes. Pronotum amplum, transverse convexum, antice breviter truncatum, verticem liberans, postice ad angulos humerales convexiusculum, medio obtuse angulatum; disco ante medium fusce biplagiato et prope marginem anticum maculâ subtriangulari fuscâ, margine postico plus minusve fusco. Elytra abdomen superantia, badia, subopaca, venis parum elevatis, campo anali lanceolato, acutiusculo. Alæ dilute infuscatæ, venis partis anticæ flavescentibus, venis axillaribus fuscis, campo antico anguste flavescente, venis costalibus numerosis, parallelis, apice haud incrassatis, venâ discoidali integrâ, rectâ, venâ mediâ atque venâ ulnari fortiter curvatis, propter hoc venâ ulnari tantum prope apicem alarum 4-ramosâ, venâ axillari 4-5-ramosâ. Pedes pallidi; femoribus anticis antice spinis basalibus magnis, margine in tertiâ parte apicali spinis minutis; metatarso postico articulis sequentibus simul sumptis multo longiore. Abdomen latum, superne badium, fusco variegatum, inferne nigrum, nitidum, lateribus flavo maculatum. Lamina supra-analis ♂ ♀ trigona, subæquilatera, utrinque sinuata, postice rotundata, medio breviter excisa; lamina subgenitalis ♂ parva, apice irregulariter rotundata; styli apice bifidi. Segmentum ultimum ventrale ♀ amplum, rotundatum.

Long. corp. ♂ 14; pron. 3.6; elytr. 18 mm.

" " ♀ 16; " 4.8; " 19 (?) * mm.

Loc. Seychelles. Silhouette: near Mont Pot-à-eau, over 1000 feet, viii. 1908, 1 ♀. Mahé: Cascade Estate, 1905, 1 ♂ (*Gardiner*).

This species approaches *Blattella curvinervis*, Sauss., in the curvature of the longitudinal veins of the anterior part of the wings, a character which is found again in *B. adversa*, Sauss.; but these species differ so much from that

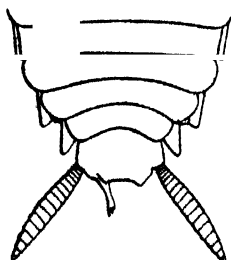
* Apical parts of elytra broken off in the ♀ specimen.

described above that it is unnecessary to enumerate the points of difference, and, moreover, they do not belong to the genus *Onychostylus*. The armature of the anterior femora falls under the type A of de Saussure, because on their anterior edge not far from the base they present three strong spines, followed by a series of other very small spines, which occupy the apical third of this edge. The brown colouring of the marks on the pronotum is but little apparent. I have only been able to examine one ♂ and one ♀, not in very good preservation.

28. *Onychostylus zonatus*, sp. n. (Fig. 22.)

Color stramineus. Caput pallidum, fronte fasciâ latâ longitudinali inter antennis utrinque breviter productâ, vertice inter oculos longitudinaliter fusco bitæniato. Antennæ pallidæ, articulo primo valido, duobus sequentibus parvis. Pronotum suborbiculare, antice breviter subtruncatum, caput parum liberans, postice late subrotundato-truncatum; disco pallido, lineâ longitudinali supra marginem anticum ampliâ, fasciâ latâ transversâ, antice sinuatâ, ante medium sitâ, necnon fasciâ marginali posticâ inter angulos humerales extensâ, nigris. Elytra ♂ ♀ abdomen valde superantia, dilute ferruginea, margine antico late flavescente,

Fig. 22.



Onychostylus zonatus, sp. n., ♂; extremity of abdomen from beneath.

campo anali ante medium marginis suturalis desinente, basi fusciore. Alæ pallidissime infuscatæ, venis ferrugineo-fuscis, campo antico apicem versus sensim angustato, campo postico apice rotundato, campo anteriore per aream triangularem latiusculam disjuncto, margine antico subopaco, venis costalibus indivisis, parallelis, apicem versus subincrassatis, venâ ulnari triramosâ, venâ axillari apice furcatâ. Pedes pallide testacei; femora antica subtus tota æqualiter spinosa, superne spinâ apicali

instructa, arolio explicato. Abdomen disco plus minuse castaneo-picto. Cerci longi, obscure testacei. Lamina supra-analis ♂ pentagona, apice obtuse excisa. Lamina subgenitalis ♂ irregulariter explicata, lateribus sinuata, margine postico arcuato-sinuato, in latere sinistro lobo angusto apice trifido instructa. Lamina supra-analis ♀ trigona, apice sinuata. Segmentum ultimum ventrale ♀ transversum, margine postico rotundatum, medio obtuse subproductum.

Long. corp. ♂ 13; pron. 3; elytr. 14 mm.

" " ♀ 13; " 3.2; " 12 "

Loc. Seychelles: Praslin, 1905, 1 ♂, 1 ♀ (*Gardiner*).

This species is notable from its size and coloration. The pronotum is traversed a little before the middle by a broad black band, sinuate in the middle in front, and united to the front margin by a line of the same colour, which expands slightly on this margin; the hind margin is bordered with black between the humeral angles. The insect is also remarkable because the subgenital lamina of the male is provided with a three-toothed prolongation at its right extremity; this disposition is found also in the two following species, although in them the conformation of the lobe is different.

O. zonatus and the two following species would deserve to form a separate genus; but since they cannot be referred to any of the genera which R. Shelford proposed to erect at the expense of the genus *Blattella*, Caud., I prefer to place them in the genus *Onychostylus*, modifying slightly the diagnosis of this genus, which would henceforth include those species in which the subgenital lamina of the male is furnished with differently formed appendages replacing the styles, or, in other words, with the styles transformed and diversely formed, often bifid at the extremity or provided with claws or spines.

29. *Onychostylus biplagiatus*, sp. n. (Fig. 23.)

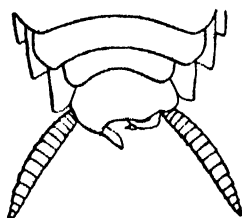
O. zonato valde affinis, staturâ parum minor. Frons fasciâ latâ, nigrâ, inter scrobas antennarum sensim ampliâ et pone ampliatiorem breviter coarctatâ. Pronotum pallide ferrugineum, antice maculâ parvâ marginali, ante medium maculis discoidalibus duabus inter se parum distantibus, margine postico inter humeros nigro. Elytra lata, subpellucida, abdomen superantia. Alæ dilute fuscæ, antice pallidiores. Pedes pallidi, coxis basi infuscatis. Abdomen superne dilute castaneum, segmentis singulis postice et lateribus infuscatis, marginibus lateralibus pallidioribus; subtus fusco-castaneum, segmentis disco dilutioribus, lateribus

maculis flavis. Lamina supra-analis ♂ inter cercos rotundato-producta, apice subindistincte sinuata; infra-analis apice irregulariter sinuata, stylo sinistro nullo. Segmentum ultimum ♀ late rotundatum.

Long. corp. ♂ ♀ 12; pron. 3; elytr. 12 mm.

Loc. Seychelles: Silhouette, Mahé. Silhouette: near Mont Pot-à-eau, over 1000 feet, viii. 1908; Mare aux Cochons plateau and forest just above, over 1000 feet, ix. 1908. Mahé: near Morne Blanc, about 1000 feet, xi. 1908, and Cascade Estate, ii. 1909. 19 specimens, all from endemic forest districts.

Fig. 23.



Onychostylus biplagiatus, sp. n., ♂; extremity of abdomen from beneath.

I consider as a variety of this species two female examples the coloration of which is less accentuated, the frons being ornamented only with an angular line prolonged at the lower angle in the form of a Y, the pronotum having the discoidal marks almost effaced, while the black marks of the front margin and the black border of the hind margin have also disappeared. The *ootheca* of this insect is brownish, twice as long as broad, with broad dorsal suture, and crossed transversely by a multitude of fine parallel lines of lighter colour: it measures 5 by 2.2 mm.

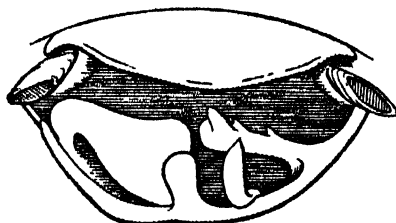
80. *Onychostylus labyrinthicus*, sp. n. (Figs. 24-26.)

O. zonato valde proximus, sed staturâ multo minor, fronte pallidâ, lineâ transversâ mediâ antice productâ, alterâ inter oculos arcuatâ, epistomate maculis duabus basalibus, necnon labro, nigris; pronoto disco antice irregulariter nigro adperso; elytris ferrugineis, nitidiusculis; pedibus pallidis, coxis basi parce fusco maculatis; abdomine pallido, maculis marginalibus seriatis, necnon disco utrinque lineâ pluries interruptâ, fusco-nigris. Lamina supra-analis ♂ parva, subtrigona, margine postico rotundato; subgenitalis producta, rotundata, apice in latere dextro lobo parvo, apice leviter ampliato, rotundato, instructa. Lamina supra-analis ♀ transversa, apice obtuse rotundata, sulcis duobus apice

convergentibus, prope marginem distinctis. Segmentum anale
ventrale ♀ productum, rotundatum.

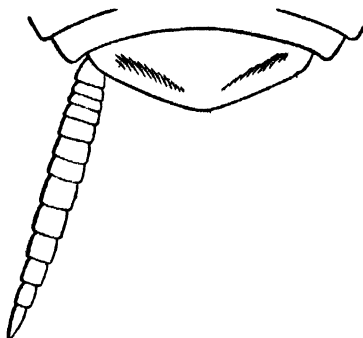
Long. corp. ♂ ♀ 10; pron. 2; elytr. 9 mm.

Fig. 24.



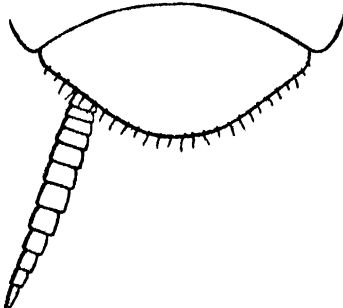
Onychostylus labyrinthicus, sp. n., ♂; extremity of abdomen from behind.

Fig 25



Onychostylus labyrinthicus, ♀; supra-anal lamina.

Fig 26.



Onychostylus labyrinthicus, ♀; last ventral segment.

Loc. Seychelles: Silhouette, Mahé. Silhouette: near Mont Pot-à-eau, over 1000 feet, and Mare aux Cochons plateau and forest above, over 1000 feet, viii.-ix. 1908, 7 specimens. Mahé, 1905, 1 example (*Gardiner*).

This species is much smaller than, but otherwise has a considerable resemblance to, those described above. The pronotum is ornamented on the anterior half of the disc with little reddish-brown marks, irregularly disposed, and with an ill-defined mark of the same colour on the front margin; posteriorly it has a blackish border stretching between the humeral angles. The wings are almost transparent, with the ulnar vein two- or three-branched, the branches being directed towards the apex of the anterior field, and the marginal field does not surpass at its extremity the triangular area or the apical part of the posterior field, which makes the wing appear truncated at its extremity.

TEMNOPTERYX, Brunner.

31. *Temnopteryx truncata* (Saussure).

Blutta truncata, Saussure, Mém. Soc. Genève, xvii. p. 148, pl. i. fig. 12 (1804).

Loc. Seychelles: Dennis Island (an outlying coral-island), viii. 1908, one specimen (*J. C. F. Fryer*).

This species was first discovered at Pondicherry, and, although there is but a single example from the Seychelles, I think the determination is certain, because the only difference that can be recorded, besides the slightly larger size, is that the posterior margin of the elytra is a little sinuate in the middle on account of the anal area slightly surpassing the discoidal.

32. *Temnopteryx dimidiatipes*, Bolivar, An. Soc. Esp. de Hist. Nat. xix. p. 800, pl. i. fig. 1 (1890).

Loc. Seychelles: Long Island, a small cultivated islet near Mahé, vii. 1908, 13 specimens; Silhouette, probably from lower, cultivated country, viii. 1908, 2 specimens.

Previously known only from the Philippines.

DISTICHOPIS, gen. nov.

Corpus oblongo-elongatum, antice posticeque rotundatum, convexum, nitidiusculum, subapterum. Caput obtectum, fronte convexa, vertex inter oculos convexo, latiusculo, antennis gracilibus, articulis (basalibus exceptis) villosis, articulo tertio secundo
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duplo longiore. Pronotum transverse convexum, antice rotundatum, postice subtruncatum, tantum medio levissime arcuato-productum. Metanotum postice latissime sinuatum. Elytra in ♂ lobiformia, cornea, imperfecte explicata; in ♀ nulla. Pedes robusti; femoribus apice spinâ instructis, subtus margine antico spinis subæqualibus usque ad medium armato, spinâ apicali fortiori, margine postico spinis tantum tribus validis, femoribus quatuor posterioribus antice posticeque spinosis, margine postico spinis validioribus; tibiis spinosissimis, spinis validis supra in seriebus tribus dispositis; tarsis compressiusculis, metatarso articulis sequentibus simul sumptis fere æquali, arolio parvo instructis. Abdomen superne convexum. Lamina supra-analis ♂ transversa, arcuato-producta; lamina subgenitalis ♂ parva, rotundata, styli longiusculis, inæqualibus; cerci magni, depressi, elongati. Segmentum ultimum dorsale abdominale ♀ magnum, medio rotundato-productum, utrinque sinuatum; lamina supra-analis parva, trigona, medio carinata; segmentum ventrale ultimum ♀ magnum, rotundato-productum, lateribus subsinuatum, valvulis nullis.

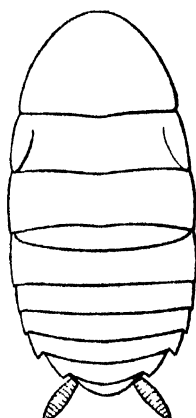
The position of this genus in the system of BLATTIDÆ is somewhat difficult. One would be tempted by its size and general appearance to place the insect in the BLATTINÆ near *Polyzosteria*, but the absence of valves on the last ventral segment in the female does not permit its being referred to that tribe. Rather must it be placed in the PHYLLODROMINÆ near *Loboptera*, to which it approximates in the form of the anal pieces, although the size, the convexity of the body, and the general *facies* do not quite agree with those of the PHYLLODROMINÆ. The elytra are reduced in the ♂ to lateral scales, not entirely separated, on the inner side near the base, from the integument of the dorsum, and they are completely wanting in the female.

GENOTYPE, *Distichopsis stylopyga*, sp. n.

33. *Distichopsis stylopyga*, sp. n. (Figs. 27-31.)

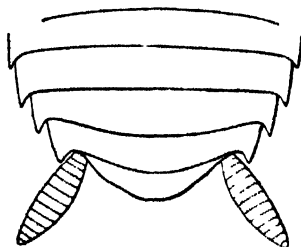
Magna, corpore antice posticeque rotundato, lateribus rectis, nigropicea, tantum labro rufescente, mesonoto et metenoto necnon abdomine superne brevissime griseo sub-villosa. Elytra ♂ marginem posticum mesonoti vix superantia, ♀ nulla. Abdomen segmentis dorsalibus lateraliter acute productis. Pedes nigro-castanei, fortiter spinosi, tarsis castaneis, pulvillo metatarsi brevi, tertiam partem metatarsi haud attingente. Segmentum ultimum dorsale abdominis utrinque sinuatum et medio rotundato-productum. Lamina supra-analis ♂ fortiter transversa, medio late producta, rotundato-subtruncata. Cerci latiusculi, breves, depressi, articulis valde transversis, parum distinctis, compositi. Lamina subgenitalis ♂ breviter transversa, parva, postice rotundata; styli longiusculi, graciles, aciculati. Segmentum pænultimum dorsale

Fig. 27.



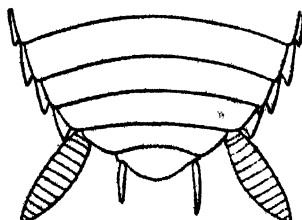
Distichopsis stylopyga, gen. et sp. n., ♂, $\times 2\frac{1}{2}$.

Fig. 28.



Distichopsis stylopyga, ♂ ; extremity of abdomen from above.

Fig. 29.



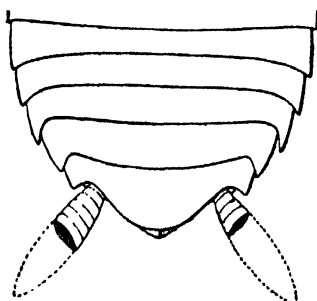
Distichopsis stylopyga, ♂ ; extremity of abdomen from beneath.

♀ magis quam in ♂ productum; lamina supra-analis transversa, subtriangularis, medio carinata, apice obtuse angulata. Segmentum ultimum ventrale ♀ amplum, postice utrinque sub-sinuatum, medio late rotundatum.

Long. corp. ♂ 24; pron. 7; elytr. 3.5 mm.

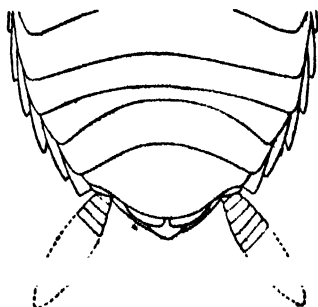
" " ♀ 20; " 6 mm.

Fig. 30.



Distichopsis stylopyga, ♀; extremity of abdomen from above.

Fig. 31.



Distichopsis stylopyga, ♀; extremity of abdomen from beneath.

Loc. Seychelles. Silhouette: from low country near the sea, viii. 1908, 1 ♂. Four other examples were collected in the Seychelles by J. Stanley Gardiner in 1905, but in which particular island is not recorded.

HOLEPTOBLATTA, gen. nov.

Corpus valde depressum, latiusculum. Caput cordiforme, transversum; vertex late truncatus. Palpi maxillares breves, articulo ultimo incrassato, elongato-conico. Antennæ filiformes. Pronotum

transversum, antice late arcuatum, verticem vix, oculos valde, liberans, postice late subtruncatum. Elytra scutellum liberantia, apicem abdominis attingentia vel parum superantia, opaca, superne nitidiuscula, oblonga, apicem versus sensim angustata et apice anguste rotundata. Alæ elytris breviores, hyalinæ, venis costalibus plurimis parallelis, venâ medianâ sinuosâ, venâ ulnari atque venâ axillari primâ, biramosis; campo apicali nullo. Pedes robusti; femora parum spinosa, apice spinâ armatâ; tibiæ valde fortiterque spinosæ; tarsi filiformes, breves, tertiâ parte tibiæ posticarum vix attingentes, articulo primo articulis reliquis simul sumptis longiore, pulvillis nullis, arolio magno. Lamina supra-analis trigona, apice rotundata. Cerci elongati, latiusculi, apice angustati. Lamina subgenitalis ♂ irregulariter explicata, styli . . . ?; ♀ lata, apice rotundata.

This genus is characterised by the flattened, subquadri-lateral form of the body, which resembles that of *Hololepta* among the Histeridæ (Coleoptera). Head large and exposed in front of the pronotum, eyes prominent on account of the rounding off of the front angles of the pronotum, antennæ filiform, maxillary palpi short with the terminal segment thickened. Pronotum strongly transverse, regularly narrowed in front. Elytra opaque and strongly coriaceous, leaving exposed the scutellum at the base and extending over the whole abdomen in both sexes. Wings well developed, but shorter than the elytra. They have the same venulation as in the Phyllodromiines, with the ulnar vein divided after the middle and again before the extremity; the apical field is wanting. Legs robust with femora very little spiny, tibiæ and tarsi as described above; the smallness of the tarsi, which are at the same time very slender, should be emphasised.

This genus, extraordinary from the flattening of the body and the smallness of the tarsi, should be placed near the genera *Macrophyllodromia* and *Pseudophyllodromia*; it exhibits like them a remarkably wide separation of the eyes. The *Hololeptoblattæ* were found only in the spaces between the bases of the leaves of endemic species of *Pandanus* *.

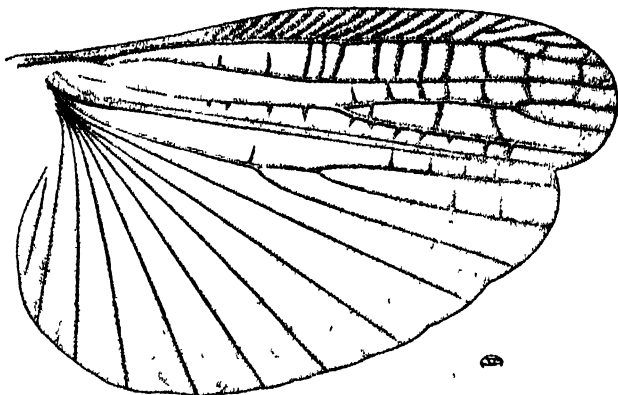
GENOTYPE, *Hololeptoblatta pandanicola*, sp. n.

* [See Scott, Tr. Linn. Soc. London, ser. 2, Zool. xiv. p. 25 (1910), and Ann. & Mag. Nat. Hist. (8) x. p. 426 (1912). In the New World a number of species of cockroaches are known to inhabit Bromeliacæ—e. g., the species from Trinidad described by R. Shelford in Scott's paper cited immediately above (1912); a list of bromeliadiculous cockroaches is given by Picardo (Bull. Sci. France et Belgique, (7) xlvii. p. 344 (1913)) in his big work on the Bromeliad-fauna. Compare also footnote above, p. 314.—H. S.]

34. *Hololeptoblatta pandanicola*, sp. n. (Figs. 32-36.)

castaneo-fusca. Antennæ albescentes, longe pone medium annulo fusco ornatæ. Pronotum unicolor vel disco fusco vario. Elytra ferrugineo-castanea, apicem abdominis attingentia, venâ mediastinâ obscuratâ. Alæ basi hyalinæ, extus infumatæ, venis fuscis.

Fig. 32.



Hololeptoblatta pandanicola, gen. et sp. n., ♂; hind wing.

Fig. 33.



Hololeptoblatta pandanicola, ♂; extremity of abdomen, with supra-anal lamina, from above.

Fig. 34.



Hololeptoblatta pandanicola, ♂; extremity of abdomen, with subgenital lamina, from beneath.

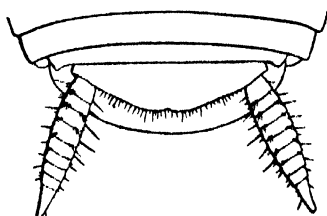
Femora nigro-fusca; tibiæ obscure ferruginæ; spinis apicalibus tibiæ posticarum longis; tarsi ferruginei, apicem versus infuscati. Abdomen nigrum. Lamina supra-analis ♂ trigona, apice

subsinuata. Cerci latiusculi, acuminati. Lamina subgenitalis ♂ irregulariter explicata, oblique truncata, apice biappendiculatâ. Styli nulli? Lamina supra-analis ♀ trigona, fortiter transversa, apice medio subsinuata. Segmentum ultimum ventrale ♀ transverse ovatum.

Long. corp. ♂ 9; pron. 2·5-3; elytr. 8 mm.

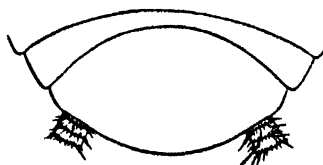
" " ♀ 10; " 2·8-3·3; " 7 "

Fig. 35.



Hololeptoblatta pandanicola, ♀; extremity of abdomen and supra-anal lamina, from above.

Fig. 36.



Hololeptoblatta pandanicola, ♀; extremity of abdomen and last ventral segment, from beneath.

Loc. Seychelles. Silhouette: forest near Mare aux Cochons, viii.-ix. 1908, 9 adults and 3 immature examples (Gardiner); from between leaf-bases of two growing trees of *Pandanus hornei* in forest above Mare aux Cochons, ix. 1908, 3 specimens; and 1 example taken quite near the Mare aux Cochons plateau.

35. *Hololeptoblatta minor*, sp. n.

A *H. pandanicola* tantum differt: Statura minore; antennis pone medium fusco-biannulatis, necnon tibiarum spinis apicalibus articulo primo tarsorum tantum subæquantibus. Lamina supra-analis ♀ trigona, parum latior quam longior, apice rotundata et subindistincte sinuata; segmentum ultimum ventrale haud transversum, vix latius quam longius, apice valde rotundatum. ♀. Long. corp. 8·5; pron. 2·5-3·5; elytr. 5·8 mm.

Loc. Seychelles. Mahé: 4 adults and 4 immature specimens taken from between leaf-bases of stunted *Pandanus* on summit of Mount Sebert, nearly 2000 feet, 16. i. 1909*.

Blattinæ.

STYLOPYGA, Fisch.-Waldh.

36. *Stylopyga rhombifolia* (Stoll).

Blatta rhombifolia, Stoll, Spectres, Blatt. p. 5, pl. iii. d, fig. 13 (1813).

Loc. Amirantes: Desroches I., 15. x. 1905, 1 specimen. Cargados Is.: Establishment I., 28. viii. 1905, 2 specimens. Seychelles: only from an outlying low coral-island, namely, Bird I., vii. 1908, 8 examples (*Fryer*).

Recorded from Asia, Africa, and America.

PERIPLANETA, Burmeister.

37. *Periplaneta americana* (L.).

Blatta americana, L., Syst. Nat. ed. x. i. p. 424 (1758).

Loc. Chagos Is.: Peros Banhos Atoll, Diamant I., near houses, 19. v. 1905, 1 specimen. Cargados Is.: Siren I., 27. viii. 1905, 1 example. Seychelles: Bird I. and Dennis I. (low outlying coral-islands), vii.-viii. 1908, 3 specimens; Mahé, Cascade Estate, about 800 feet, in and about house, 1909; Long I., vii. 1908.

A cosmopolitan species, distributed even over the interior of continents.

38. *Periplaneta australasiae* (Fabr.).

Blatta australasiae, Fabr., Syst. Ent. p. 271 (1775).

Loc. Chagos Is.: Salomon Atoll and Diego Garcia, 1905. Farquhar Atoll, 1905. Amirantes: Poivre I., 1905. Coetivy, 1905. Seychelles: Silhouette (cultivated country), Mahé and Dennis I.: previously taken in Mahé by Alluaud, 1892 (Bolivar, Ann. Soc. Ent. France, p. 372 (1895)).

As widely distributed as the preceding.

[A widely-spread species, *Periplaneta truncata*, was also

* [A remarkable locality; an expanse of bare granite glacia, with patches of very peculiar stunted endemic forest, among which I was shown two endemic plants, a bush and a climbing plant, believed to be the only individuals of their respective species at that time existing in a wild state.—H. S.]

recorded from Mahé by Bolivar, *l. c.* One poorly-preserved specimen from Dennis I., 1908 (*Fryer*), was very doubtfully referred to this species by the late R. Shelford, but by an oversight it was not submitted to Dr. Bolivar for confirmation of the determination.]

Panchlorinæ.

PYCNOSCELUS, Scudder.

39. *Pycnoscelus surinamensis* (L.).

Blutta surinamensis, L., Syst. Nat. ed. x. i. p. 424 (1758).

Leucophaea surinamensis, auct.; Bolivar, Ann. Soc. Ent. France, p. 372 (1895).

Loc. Seychelles, Coetivy, Amirantes, Farquhar Group, Chagos, Cargados, Aldabra, Cosmoledo, Astove, Assumption. Taken in greater numbers than any other species of cockroach, about 116 examples being present, in various stages of development, from all the groups of islands visited. In the Seychelles a long series was obtained in Silhouette, Mahé, Long I., Bird I., and Dennis I.; but in Silhouette and Mahé the species was only taken in places in the cultivated country near the coast (with the exception of two specimens from Cascade Estate at about 800 feet) and did not extend up into the high endemic forests; it was previously found by Alluaud (1892) in Mahé, La Digue, and Praslin. Amirantes: Eagle I. and Desroches I., 1905. Farquhar Group: Farquhar Atoll, 1905, and St. Pierre, 1907, series with elytra and wings not developed. Cargados: Siren I., 27. viii., and Establishment I., 28. viii. 1905. Chagos: Diego Garcia and Peros Banhos Atolls, 1905, in rotten wood. Aldabra, 1907 and 1908 (*Thomasset, Fryer*); Cosmoledo, 1907 (*Thomasset*); Astove, 1907 (*Thomasset*); Assumption, 1908 (*Fryer*).

Specimens from Dennis I. belong to var. *indica**. Brunner himself having recognised that *Pycnoscelus obscurus*, Scudder, was described on a young individual of *Leucophaea surinamensis* (L.), the name *Pycnoscelus* must be accepted in place of *Leucophaea*, as being older. This species is cosmopolitan, occurring even in the interior of Europe, where it has been recorded from glass-houses in Botanic Gardens.

* [Only a small portion of the long series from all the archipelagoes could be submitted to Dr. Bolivar.—H. S.]

NAUPHÆTA, Burmeister.

40. *Nauphæta cinerea* (Olivier).

Blatta cinerea, Ol., Enc. Méth., Ins. iv. p. 314 (1789).

Loc. Seychelles: Dennis I., viii. 1908 (*Fryer*); Mahé, xi. 1908. Coctivy, 1905. Amirantes: Desroches I. and Eagle I., 1905. 12 specimens in all.

First recorded from Mauritius and Madagascar, it has been subsequently found in Sumatra, Philippines, Polynesia, and finally America, and may therefore be considered cosmopolitan.

41. *Nauphæta madecassa*, Saussure, Soc. Ent. vi. p. 17 (1891).

Loc. Cargados: Establishment I., 28. viii. 1905. Aldabra: Ile Michel, x. 1908, and Picard I., i. 1909 (*Fryer*). Cosmoledo, 1907 (*Thomasset*). 27 specimens.

This species was only known from Madagascar.

HOLOCOMPSA, Burmeister.

42. *Holocompsa pusilla*, sp. n. (Figs. 37, 38.)

Parva, castaneo-nigra, fere unicolor, nitidiuscula. Caput nigro-castaneum, inter oculos haud fasciatum. Pronotum unicolor,

Fig. 37.



Holocompsa pusilla, sp. n., ♀; elytron.

Fig. 38.



Holocompsa pusilla, ♀; hind wing.

transversum, antice rotundatum, postice fere recte truncatum. Scutellum magnum, triangulare, æquilaterale. Elytra abdomen superantia, areâ externâ necnon campo anali coriaceis, campo

discoidali immo basi exceptâ pellucido, medio maculâ fuscâ nebulosâ apicem marginesque liberante. Alæ tenuissimæ, campo antico venis indistinctis, stigmate magno, apice rotundato, subtruncato, versus basin angustato, campo postico obscure fusco, venis axillaribus ultimis fuscis, basi breviter hyalinâ. Pedes fusco-castanei, basi tibiæ tarsisque pallidis. Abdomen castaneum. Lamina supra-analis postice rotundata, transversa. Cerci pallidi. ♀.

Long. corp. ♀ 3.5; pron. 1.2; elytr. 4 mm.

Loc. Seychelles: Mahé, from near Morne Blanc, x. 1908, 1 example.

I already had in my collection a specimen from Los Baños, Philippine Is., which I owe to the generosity of Mr. Baker. This species resembles *H. capsoides*, Shelford, from the Lower Ogowé (Gaboon, W. Africa), in having the venulation of the hind wings almost effaced, so that only the last axillary veins can be distinguished; but in the new species the discoidal field of the elytra is almost entirely pellucid, which causes the line of separation between the membranous portion and the opaque portion to describe a curve, while in *H. capsoides* it is almost straight, slightly curved near the anal field; moreover, in this latter species (*H. capsoides*) the membranous portion is pellucid at the base and obscure at the apex, while in *H. pusilla* it is occupied by a dark mark not reaching to the apex, which is transparent. In the hind wings the stigma formed by the anterior veins is thicker, and is darker in its first part while lighter in the remainder.

Panesthiinæ.

PANESTHIA, Serville.

43. *Panesthia javanica*, Serville, Ann. Sci. Nat. xxii. p. 38 (1831); Bolivar, Ann. Soc. Ent. France, p. 372 (1895).

Loc. Seychelles: Silhouette, Mahé, Praslin. This Oriental species has spread some distance up the mountains of Silhouette and Mahé, as well as occurring in cultivated country near the coast; it is often found in rotting trunks; specimens were taken in Mahé on Morne Seychellois and at Cascade in 1905, and in Silhouette at Mare aux Cochons, over 1000 feet, in 1908. In Praslin it was obtained in 1905 and 1908. 25 specimens in all. It was taken in Mahé by Alluaud in 1892.

This species is known from Burma, Malacca, Java,

Borneo, and Philippines. The genus has not been found represented (apart from the Seychelles record) outside the Oriental and Australasian Regions.

MANTIDÆ.

POLYSPILOTA, Burmeister.

1. *Polyspilota æruginosa* (Goeze).

Mantis æruginosa, Goeze, Ent. Beitr. ii. p. 35 (1778).

Mantis striata, Stoll, Représ. Spectres. etc. p. 34, pl. xi. fig. 41 (1813).

Mantis pustulata, Stoll, ibid. p. 59, pl. xx. fig. 73.

The synonymy of this species is now well established, having been expounded exhaustively by Giglio-Tos in "Mantidi Esotici, II. Le Polispile," p. 22, 1911 (Bull. Soc. Ent. Ital. xlii., 1910). It presents two forms, generally regarded as two different species under the names *P. variegata*, Ol., and *P. pustulata*, Stoll. The range of the genus is almost exclusively in the Ethiopian Region, and the species with which we are concerned occurs abundantly over all Equatorial Africa. It has been already recorded from the Seychelles and even from Amboina and Borneo, but these two last records require confirmation.

The collection before me contains examples [of the typical form] from Aldabra and Cosmoledo, exhibiting an almost uniform pale [*i. e.*, green during life] coloration, with the stigma of the elytra terminated in front and behind by a brownish mark.

Var. *seychelliana*, Giglio-Tos, *op. cit.* p. 26.

The specimens belonging to this variety are constant in being of smaller size; some individuals have the elytra entirely of a uniform green, excepting the hyaline discoidal area, with its stigma almost always brown at one or at both ends. The wings are transparent, with some little brownish marks, rather more numerous in the ♂, at the apex. However, in one ♂ example from Silhouette the coloration does not differ from that of the typical form. The pale form with hyaline wings was described by de Saussure under the name "*var. prasina*" (Grandidier, Hist. Madag. xxiii. p. 206, 1895), and by Werner under the name "*viridis*" (Berichte Senckenb. Naturf. Ges. (1908)).

In the material submitted to me, a ♀ from Farquhar Atoll (1905) is remarkable for its small size: length of body, 54 mm.; of pronotum, 15 mm.; of elytra, 40 mm. Two

others, collected at Coetivy (1905), exhibit a rather different livery; the elytra are ornamented in front, along the radial veins, with four brown marks like those which limit the stigma in front and behind: they constitute a variety of small size, with the anterior field of the wings green as in the typical form, but with the anterior femora brownish as in the form *striata*, Stoll.

Loc. Seychelles, Amirantes, Coetivy, Farquhar, Aldabra, Assumption, and Cosmoledo Islands.

[Owing to the difficulty of sending these large but fragile insects long distances, only samples of the material were submitted to Dr. Bolivar. The following is a complete summary of the localities, number of specimens, and proportions of the two sexes. In the Seychelles proper these Mantids are not usually found in the damp endemic forests at high elevations; few were captured much above 1000 feet, nearly all occurred in lower, and often in cultivated, places. There is no segregation of any of the forms in any particular group of islands or locality, a fact which entirely agrees with the findings of Giglio-Tos (*op. cit.* p. 25). On the other hand, var. *seychelliana* seems to be only known in the ♀ sex, and form *pustulata*, in this collection at any rate, is much more numerous in the ♂ sex:—

(i.) *Typical form*.—Aldabra, 1 ♀, and Cosmoledo, 3 ♀ (all collected by H. P. Thomasset, 1907). Length about 55–77 mm. from front of head to end of abdomen (65–84 mm., front of head to end of folded wings).

(ii.) Var. *seychelliana*, Giglio-Tos.—Elytra practically entirely green except for the whitish stigma, which is almost always tinged with brown at one or at both ends (in the example from Assumption, however, the brown is practically completely absent). 16 specimens, all ♀ (the two examples on which Giglio-Tos founded the variety were also ♀); length, front of head to end of abdomen, 50–56 mm. Seychelles: Silhouette, Mare aux Cochons plateau, over 1000 feet, ix. 1908, 5 ♀; Mahé, Cascade Estate, about 1000 feet, 1 ♀, and 4 other ♀ without exact record. Farquhar Atoll, 1905, 1 ♀. Assumption, 1910, 1 ♀ (*R. P. Dupont*). Aldabra, 1907, 2 ♀ (*H. P. Thomasset*), and 1908–9, 2 ♀ (*J. C. F. Fryer*).

(iii.) Form *pustulata*, Stoll.—Anterior area of elytra bright green, their median portion usually more or less tinged or mottled with brownish, which is darkest at either end of the white stigma, and their posterior part broadly hyaline; hind wings with several dark marks along the

anterior part, and with the anal area almost always more or less clouded or mottled with a smoky tinge. 10 ♂, 2 ♀; the ♂ vary in length from 41 mm. to end of abdomen (49 mm. to end of folded wings) in an example from Coetivy, to 63 mm. to end of abdomen (73 mm. to end of folded wings) in a specimen from Desroches I. (Amirantes); ♀, from 54 mm. to end of abdomen in an example from Coetivy, to 68 mm. to end of abdomen in a specimen from Desroches. Seychelles: Silhouette, Mare aux Cochons, over 1000 feet, viii. 1908, 2 ♂; Mahé, Cascade Estate, about 1000 feet, 1 ♂. Coetivy, 1905, 4 ♂, 1 ♀. Amirantes: Desroches I., 1905, 1 ♂, 1 ♀. Assumption, 1910, 1 ♂ (*R. P. Dupont*). Aldabra, 1907, 1 ♂ (*H. P. Thomasset*).

(iv.) Form *variegata*, Ol. (*striata*, Stoll).—No green colouring at all, entirely mottled and variegated with greyish and brownish. 7 ♂, 7 ♀; the ♂ vary in length from 48 mm. to end of abdomen (55 mm. to end of folded wings) in a specimen from Mahé, to nearly 60 mm. to end of abdomen (63 mm. to end of folded wings) in an example from Coetivy; ♀, from 52 mm. to end of abdomen (nearly 60 mm. to end of folded wings) in a specimen from Farquhar, to 62 mm. to end of abdomen (nearly 69 mm. to end of wings) in an example from Desroches. Seychelles: Silhouette, viii.-ix. 1908, 5 ♂ (4 from Mare aux Cochons, over 1000 feet, 1 from the lower cultivated country). Coetivy, 1905, 1 ♂. Amirantes: Desroches I., 1905, 4 ♀ (one being dated 15. x.). Farquhar Atoll, 1905, 2 ♀. Assumption, 1910, 1 ♂ (*R. P. Dupont*). Cosmoledo, 1907, 1 ♀.—H. S.]

MANTIS, L.

2. *Mantis prasina*, Serville, Ins. Orth. p. 195 (1839).

This species inhabits the islands of Mauritius and Bourbon; it occurs also in Madagascar and in Africa. Stål has recorded *Mantis emortualis* as a synonym of *M. prasina* (Syst. Mant. p. 61, 1877), but Kirby, while accepting this synonymy in his Cat. Orthoptera, accompanies it with a note of interrogation; Giglio-Tos, more decisively, considers *M. emortualis* as different from *M. prasina* (see "Mantidi Esotici," Bull. Soc. Ent. Ital. xliii. (1911), pp. 17, 19, 1912).

Loc. Coetivy, 1905, 1 ♂. Assumption, 1910, 2 ♂ (*R. P. Dupont*).

GRYLLIDÆ (SUPPLEMENT).

My report on the ACRYDIIDÆ, PHASGONURIDÆ, and GRYLLIDÆ of the Percy Sladen Trust Expedition was published in Trans. Linn. Soc. London, ser. 2 (Zool.), xv. pp. 263-292 (1912), but by an oversight the following species was omitted:—

SCAPSIPEDUS, Saussure.

Scapsipedus marginatus (Afzel. et Brann.).

Acheta marginata, Afzel. et Brann., Achet. Guin. p. 23, figs. 1 *a-hh*, 5 *a* (1804).

♀. *Acheta vittata*, ibid. p. 28, figs. 5 *b*, 10 *a, b*.

Loc. Cosmoledo, 1 ♂. A species recorded from tropical Africa and from other parts of that continent.

[In the above-cited earlier report on the ACRYDIIDÆ, etc., no mention was made of *Hedotettix granulatus*, an Acrydind from Mahé, described by Dr. Bolivar in 1895 among the species collected in the Seychelles by Alluaud. It was not obtained by the Percy Sladen Trust Expedition, but should have been included in the report to make the list complete. All the other species taken by Alluaud were found again by the Percy Sladen Trust Expedition.—H. S.]

XLVI.—New or little-known Tipulidæ (Diptera).—XXI.

Australasian Species. By CHARLES P. ALEXANDER, Ph.D., F.E.S., Massachusetts Agricultural College, Amherst, Massachusetts, U.S.A.

THE present paper is based on important collections from New South Wales, collected by Dr. Ferguson and Mr. Robinson, and from New Zealand, collected by Messrs. Harris, Howes, and Tapley, and Mr. and Mrs. J. G. Myers. I am very greatly indebted to all the above for the privilege of studying these important collections. Except where stated to the contrary, the types are preserved in the writer's collection.

Dicranomyia circularis, sp. n.

Belongs to the *huttoni* group; most nearly allied to *D. decincta*, Edwards; male hypopygium with the ninth

tergite oval in outline, the caudal margin with a small semicircular notch.

Male.—Length 6.3 mm.; wing 6.6 mm.

Rostrum relatively short for a member of the *huttoni* group, only a little longer than the head, dark brown. Antennæ dark brown throughout, including the pedicels of the flagellar segments. Head dull grey.

Mesonotum and pleura obscure brownish orange, without distinct markings. Halteres relatively short, pale, the knobs infuscated. Legs relatively short and stout, uniformly obscure yellow, only the terminal tarsal segments and apices of tarsal segments 1 and 2 infuscated. Wings strongly tinged with yellow; stigma almost obliterated, appearing as a faint seam to *r*; very indistinct and narrow seams along the cord and outer end of cell 1st M_2 ; veins pale brown with frequent bullate areas along the cord and outer end of cell 1st M_2 . Venation: Sc_1 ending a short distance beyond the origin of Rs , Sc_2 immediately beyond this origin; Rs relatively long, sinuous; basal deflection of Cu_1 before the fork of M .

Abdomen obscure brownish yellow, the lateral margins of the tergites darker; intermediate sternites a little suffused. Male hypopygium brownish yellow. Ninth tergite oval in outline, the caudal margin with a small semicircular notch, the lateral lobes thus formed broad, obtuse, provided with many setæ; a group of three setæ on median area of tergite. Basistyles with the lobes on mesal face large, densely setiferous. Ventral dististyle with a conspicuous rostrum, armed with two spines, a shorter one beyond mid-length and a longer one immediately before mid-length, both spines straight. Dorsal dististyle only slightly curved, the tip acute. Lobes of the gonapophyses elongate.

Hab. New Zealand (South Island).

Holotype, ♂, Queenstown, Otago, December 30, 1921 (*Geo. Howes*).

Dicranomyia laterospina, sp. n.

Belongs to the *huttoni* group; antennal scape ochreous; mesonotum reddish brown, with a broad, more greyish, median stripe; femora with a narrow brown subterminal ring; wings with the stigma brown; very narrow and inconspicuous brown seams along the cord and outer end of cell 1st M_2 ; abdominal segments bicolorous; ventral dististyle of male hypopygium with the spines located on the style at the base of the rostrum.

Male.—Length 5.5 mm. ; wing 6.5–6.8 mm.

Female.—Length 6.8 mm. ; wing 6.8 mm.

Rostrum moderately elongate, about one-half longer than the head, dark. Antennæ with the scapal segments ochreous, the flagellum dark brown, the long pedicels of the segments pale. In the female the basal scapal segment is darkened apically, the second entirely pale; flagellar segments with short pale pedicels. Head grey; vertex between the eyes narrow.

Mesonotum obscure reddish brown, with a broad, more greyish median stripe extending for almost the entire length of the mesonotum, on the præscutum narrowly margined laterally with darker; postnotum pruinose, darker posteriorly. Pleura brown, sparsely pruinose. Halteres pale, the knobs darker. Legs obscure yellow, the femora with a narrow dark brown subterminal ring, the terminal tarsal segments dark brown. Wings with a faint yellowish tinge; stigma conspicuous, brown; a tiny brown spot at origin of *Rs*; very narrow and indistinct brown seams along the cord and outer end of cell 1st *M*₂; veins dark brown. Venation: *Sc*₁ ending a short distance beyond the origin of *Rs*, *Sc*₂ not far from the tip of *Sc*₁, and likewise beyond the origin of *Rs*; basal deflection of *Cu*₁ close to the fork of *M*.

Abdomen bicolorous, the basal half of the segments obscure yellow in the male, pale brown in the female; caudal margins of the segments broadly blackish; on the sternites the yellow is sometimes more extensive, in other specimens more restricted and occupying only the antero-median area of the segments; normally about the terminal third of each sternite is darkened; hypopygium ochreous. Male hypopygium with the ninth tergite bearing a U-shaped median notch. Mesal face of each basistyle produced into a rounded setiferous lobe. Ventral dististyle fleshy, produced into a blackened rostrum; two long, gently curved spines, united basally, are placed on the face of the style itself, immediately cephalad of the base of the rostrum; dorsal dististyle strongly curved, sickle-shaped, the apex blackened. Ædeagus with an apical U-shaped median notch. Ovipositor with the bases of all the valves blackened, the remainder reddish horn-colour.

Hub. New Zealand (South Island).

Holotype, ♂, Governor's Bay, Canterbury, altitude 80 feet, January 13, 1923 (*J. F. Tapley*).

Allotopotype, ♀.

Paratopotypes, 2 ♂ ♂.

Dicranomyia melina, sp. n.

General coloration light yellow; rostrum and antennal scape pale; a conspicuous semicircular black saddle on the mesonotum; mediotergite of postnotum infuscated; halteres with black knobs; wings pale yellow, the stigma dark brown; anal angle of wing infuscated; ninth segment, including basistyles of hypopygium, blackened.

Male.—Length 4 mm.; wing 6 mm.

Female.—Length about 5 mm.; wing 6 mm.

Rostrum obscure yellow; palpi pale, the outer segments weakly infuscated. Antennæ with the scape obscure yellow, the flagellum dark brown; basal flagellar segments short and somewhat crowded, the outer segments passing into oval. Head obscure yellow.

Mesonotum shiny testaceous-yellow, the median area of the præscutum very slightly darker; a conspicuous shiny black saddle, semicircular in form, extends from the lateral half of each scutal lobe cephalo-mesad across the præscutum which it traverses shortly before mid-length; postnotum with the mediotergite extensively blackened. Pleura yellow, the mesosternum infuscated. Halteres pale brown, the base of the stem narrowly yellow, the knobs conspicuously blackened. Legs with the coxæ pale yellow; trochanters a little infuscated; legs long and slender, pale brownish yellow, the femoral tips narrowly infuscated, this colour also including the extreme tibial bases; tarsi dark brown. Wings tinged with yellow, the base and costal region more strongly so; stigma short-oval, dark brown; anal angle of wing and a seam behind vein *Cu* infuscated; veins pale brown. Venation: *Sc* short, *Sc*₁ ending some distance before the origin of *Rs*, this distance about equal to *r-m*; *Rs* relatively short, arcuated, about one-fourth longer than the arcuated basal deflection of *R*₄₊₅; *r* near outer end of stigma; cell 1st *M*₂ closed, about as long as vein *M*₁₊₂ beyond it; basal deflection of *Cu*₁ just before the fork of *M*, longer than *Cu*₂.

Abdomen light yellow, the ninth segment (basistyles and tergite of hypopygium) black, the ventral dististyle obscure yellow.

Hab. New Zealand (North Island).

Holotype, ♂, Taumarunui, April 30, 1923 (*T. R. Harris*).

Allotopotype, ♀.

Dicranomyia tapleyi, sp. n.

Belongs to the *vicarians* group; general coloration chestnut-brown; rostrum ochreous; pleura shiny dark brown; wings

whitish subhyaline, the base more yellowish, the stigma and a seam along vein *Cu* conspicuously brown; *Rs* short, feebly angulated near mid-length; abdomen uniformly dark brown; male hypopygium with the ventral dististyles fleshy, the spines on rostrum stout and straight.

Male.—Length 5.6–6 mm.; wing 6.8–7.2 mm.

Rostrum ochreous, the palpi conspicuously brownish black. Antennæ black throughout, the flagellar segments oval. Head grey.

Pronotum dark brown. Mesonotum chestnut-brown, the median area of the præscutum darkened, especially anteriorly; postnotum dark brown. Pleura shiny dark brown. Halteres pale, the knobs dark brown. Legs greenish testaceous, the base of mid-coxæ infuscated; trochanters brownish testaceous; legs long and slender, light brown, the posterior femora somewhat darker; tarsi dark brown. Wings whitish subhyaline, the base somewhat more yellowish; stigma distinct, oval, brown; a brown seam along vein *Cu* in cell *M* and behind the vein; veins dark brown, the prearcular region more yellowish. Venation: *Sc* short, *Sc*₁ ending opposite the origin of the short, feebly angulated *Rs*, *Sc*₂ some distance from the tip of *Sc*₁, one-half longer than the basal deflection of *Cu*₁; cell 1st *M*₂ closed, about two-thirds the length of vein *M*₁₊₂ beyond it; basal deflection of *Cu*₁ beyond the fork of *M*.

Abdomen dark brown, the sternites a very little paler; hypopygial styles pale. Male hypopygium with the ninth tergite having a U-shaped notch. Mesal lobes of basistyles large. Ventral dististyle elongate, fleshy, the rostrum of moderate length, with two long, straight, and rather stout spines that are placed close together; dorsal dististyle sickle-shaped, the apex acute. Mesal lobe of gonapophyses broad.

Hab. New Zealand (South Island).

Holotype, ♂, Governor's Bay, Canterbury, altitude 80 feet, May 15, 1923 (*J. F. Tapley*).

Paratopotypes, 5 ♂♂.

This very distinct fly is named in honour of the collector, Mr. John Frank Tapley, to whom I am indebted for much valuable material from Banks Peninsula.

Dicranomyia gubernatoria, sp. n.

Belongs to the *monilicornis* group; rostrum and front light orange; mesonotal præscutum with three brown stripes; halteres elongate; wings with a faint greyish tinge,

the stigma pale brown; abdominal segments uniformly brown; dorsal dististyle of male hypopygium slightly curved at apex.

Male.—Length about 4 mm.; wing 5.6 mm.

Rostrum conspicuously light orange, the palpi brownish black. Antennæ dark brown, the scapal segments a little paler; flagellar segments oval. Head brown, sparsely pruinose, passing into orange on the front.

Pronotum dorsally dark brown. Mesonotal præscutum obscure testaceous with three broad brown stripes that are confluent posteriorly, the lateral stripes crossing the suture and suffusing the scutal lobes; scutellum infuscated; pronotum with the mediotergite infuscated posteriorly. Pleura yellowish testaceous, the ventral pleurites and mesosternum infuscated. Halteres elongate, the stem setiferous; base of stem light yellow, the remainder testaceous, the knobs more infuscated. Wings with a faint greyish tinge, the stigma pale brown but distinct; veins pale brown. Macrotrichiæ of veins relatively conspicuous. Venation: *Sc* short, *Sc*₁ ending some distance before the origin of *Rs*, this space a little shorter than the basal deflection of *Cu*₁; *Sc*₂ far from the tip of *Sc*₁; *Rs* strongly arcuated, about one-third longer than the basal deflection of *R*₄₊₅; cell 1st *M*₂ closed, a little less than two-thirds the length of vein *M*₁₊₂ beyond it; basal deflection of *Cu*₁ immediately beyond the fork of *M*; cell 2nd *A* narrow.

Abdominal tergites dark brown, the sternites more testaceous-brown. Male hypopygium with the mesal lobe of the basistyle large and conspicuous. Ventral dististyle large and fleshy; rostrum long, yellowish horn-coloured, with two long, gently curved spines, the tips of which are directed slightly mesad; immediately caudad of the base of the rostrum a small fleshy tubercle. Dorsal dististyle a slender curved hook with the extreme tip distinctly curved.

Hab. New Zealand (South Island).

Holotype, ♂, Governor's Bay, Canterbury, altitude 80 feet, May 15, 1928 (*J. F. Tapley*).

Limonia gemina, sp. n.

General coloration pale brown, the lateral portions of the præscutum pollinose; antennæ brownish black; fore legs brown, with a subterminal pale femoral ring; tips of all femora and all tibiæ and tarsi black; wings subhyaline, cells *C* and *Sc* dark brown; a sparse brown pattern on wing-

disk; abdominal tergites indistinctly dimidiate, dark and pale brown.

Male.—Length about 4.8 mm.; wing 6 mm.

Rostrum and palpi black. Antennæ brownish black throughout, the flagellar segments short-oval. Head brown.

Pronotum brownish black. Mesonotal præscutum pale brown, golden pollinose, with three conspicuous dark brown stripes, the median stripe very broad, the lateral stripes narrow and lying close to the median stripe, the anterior ends confluent with the median stripe or nearly so; scutal lobes brownish black, the median area narrowly pale; scutellum brown, the base and a median dash pale; postnotum dark, sparsely pruinose. Pleura pale brown with a conspicuous though relatively narrow brownish-black stripe extending from the propleura to the postnotal pleurotergite. Halteres pale, the base of the knobs a little darkened. Legs with the coxæ faintly darkened basally, the apices and trochanters pale yellow; fore femora pale basally, soon passing into brown; an obscure yellow subterminal ring a little narrower than the conspicuously blackened tips; middle legs broken; posterior femora brownish yellow, the tips blackened; tibiæ and tarsi black. Wings subhyaline; cells *C* and *Sc* dark brown; prearcular cells pale yellow except along vein *Cu*, which is dark brown; cell *Sc*₁ passing into obscure yellow; a circular brown spot at origin of *Rs*; an oval pale brown stigmal area, darker at *r* and tip of *R*₁; pale brown dots and seams at end of *Rs*, along cord and outer end of cell 1st *M*₂, and oval dots in cell 2nd *R*₁ and near the outer end of cell *R*₃; wing-margin in anal cells faintly darkened; veins dark brown. Venation: *Sc* moderately elongate, *Sc*₁ extending to just before mid-length of *Rs*, *Sc*₂ long, *Sc*₃ being shortly beyond the origin of *Rs*; *Rs* angulated and short-spurred at origin; *r* less than its own length from the tip of *R*₁; inner end of cell *R*₃ far proximad of 1st *M*₂, the basal deflection of *R*₄₊₅ more than one-half the sector; cell 1st *M*₂ closed; basal deflection of *Cu*₁ about one-third its length before the fork of *M*.

Abdomen dark brown, the apical half of each tergite a little paler brown to produce an indistinct dimidiate appearance; sternites similar, but the pale tips to the segments less clearly indicated; hypopygium obscure fulvous.

Hab. New South Wales.

Holotype, ♂, Rous, Richmond River, March 23, 1923 (*V. J. Robinson*).

Libnotes restricta, sp. n.

Male.—Length 16–17 mm.; wing 23–24 mm.

Related to *L. strigivena* (Walker), differing as follows:—

Basal segment of scape yellowish basally, the apex infuscated; second scapal segment largely infuscated. Mesonotal præscutum with the anterior half infuscated; posterior half with four brown stripes converging behind; each scutal lobe with an elongate triangular dark brown mark with the point directed backward; scutellum and postnotum pale, the centre of the scutellum with a small pale brown spot; a pruinose brown stripe traversing the suture between the mediotergite and pleurotergite of the postnotum. Femoral brown rings conspicuous; on the middle legs a little more extensive than the pale tips, on the posterior femora still narrower. Wings with the brown pattern very reduced, not appearing as spots along the veins; the markings occur at the origin and fork of *Rs*, along the cord and outer end of cell 1st *M*₂; at *Sc*₂, at *r* and tip of *R*₁, at tips of veins *Cu*₁, *Cu*₂ and the anal veins; distal half of vein *R*₄₊₅ infuscated, the others pale greenish yellow except where they transverse dark markings. Venation: *r* about one-third longer than the distal section of *R*₁. Abdominal brown markings broadly interrupted at the posterior margins of the segments.

Hab. New South Wales.

Holotype, ♂, Rous, Richmond River, April 1, 1923 (V. J. Robinson).

Paratopotypes, ♂; 2 ♂♂, August 1923.

LIMNOPHILA, Macquart.

The genus *Limnophila*, s. l., includes a considerable number of species found in all regions of the world. The structure of the adult flies seems to afford relatively few characters upon which to subdivide this heterogeneous aggregation. The genotype, *L. pictipennis* (Meigen), was designated by Westwood in 1840 and so restricts the name to the small Palearctic group that was formerly called *Pæcilostola*, Schiner, and strictly congeneric groups. Following this strict usage of the name, it seems probable that few, or possibly none, of the New Zealand species so far described as species of *Limnophila* really belong here. As indicated by Edwards, *L. delicatula*, Hutton (and *serotina*, Alexander), may be referred to *Limnophilella*, Alexander, without seriously modifying the characters of the latter

group. The remainder of the large and showy species with the broken arculus described by Hutton and Edwards (including all the species in the genus given by Edwards in his monographic revision, with the exception of *bryobia*, Mik, *delicatula*, Hutton, and *skusei*, Hutton) would seem to be referable to *Polymoria*, Philippi, a group that has, until now, been represented by a small number of Chilian species. This genus, *Rhamphophila*, Edwards, *Tinemyia*, Hutton, and a few other groups should be referred to the division Epiphragmaria, as defined by the writer (Cornell Univ. Agr. Expt. Sta., Mem. 38, p. 843, 1920). Whether or not *Polymoria* and *Epiphragma* can be maintained as distinct is questionable. The basic character of *Epiphragma* is the presence of a supernumerary cross-vein in cell C. Several species, described from the Oriental and Australasian regions, are now known in which there appears a series of more or less complete cross-veins in this cell, indicating the plasticity of the character. If the cross-vein in *Epiphragma* was lost we would have what to all appearances would be a species of *Polymoria*, or, conversely, if these numerous Australasian and Chilian species of *Polymoria* were provided with this cross-vein, there would be no question of their reference to *Epiphragma*. The structure of the immature stages, as known, all tends to show the very close relationships between the various groups of the Epiphragmaria. The author fully realizes the difficulties to be found in defining still further generic groups within this complex, yet it is obviously still more unsatisfactory to continually refer species of Hexatomine flies to *Limnophila*, a genus to which they are not closely allied. In order to remove three well-defined groups of the New Zealand fauna from this artificial situation, new generic terms are proposed herewith for these groups. Moreover, it seems advisable to treat *Metalimnophila*, Alexander, as a genus rather than as a subgeneric concept. Of the New Zealand genera, *Tinemyia*, *Rhamphophila*, *Polymoria*, *Nothophila*, *Heterolimnophila*, and *Acantholimnophila* may be referred to the division Epiphragmaria, based upon the condition of the arculus, while *Zelandomyia*, *Metalimnophila*, *Notholimnophila*, and *Harrisomyia* may be retained in the Limnophilaria. The position, in subtribes, of *Elephantomyia*, *Ischnothrix* (*Orolimnophila*), and *Atarba* is still questionable, but all three are certainly members of the tribe Hexatomini. The above distribution still leaves a few scattered species in the old genus *Limnophila* (as *skusei*, Hutton, *nebulifera*, Alexander, *latistyla*, Alexander, *quasita*, Alexander, and *oliveri*, Alexander), from which they

should be removed or finally retained as sufficient data come to hand to warrant the move.

HETEROLIMNOPHILA, gen. nov.

Antennæ short, 16-segmented; flagellar segments oval, the verticils not longer than the segments. Præscutum without tuberculate pits; pseudosutural foveæ small and lying not far from the lateral margin of the sclerite, pale, inconspicuous. Halteres elongate. Legs with tibial spurs entirely lacking. Stigma with abundant macrotrichiae; veins with macrotrichiae, these including all longitudinal veins beyond arculus, though less conspicuous on the basal third of *Cu*. Venation: *r* more or less distinct, about twice its length from the tip of *R*₁; basal deflection of *Cu*₁ before mid-length of cell 1st *M*₂; no indication of an atrophied 3rd Anal vein; anterior arculus completely lacking. Abdominal tergites with transverse to oblique impressions. Male hypopygium with two dististyles, the outer more chitinized; no interbasal processes.

Genotype, *Limnophila truncata*, Alexander (Maorian Subregion).

L. subtruncata, Alexander, likewise belongs here. Mr. Edwards has called my attention to the lack of tibial spurs. In *Limnophilella delicatula* (Hutton) there is a conspicuous remnant of 3rd *A* lying behind 2nd *A* and extending halfway to the margin. The anterior arculus is barely indicated. The genotype of *Limnophilella* (*epiphragmoides*, Alexander) has the 3rd Anal vein indicated, anterior arculus entirely lacking.

ACANTHOLIMNOPHILA, gen. nov.

Antennæ elongate, nearly as long as body, 16-segmented, the verticils shorter than the segments. Præscutum without tuberculate pits; pseudosutural foveæ very shallow and inconspicuous. Legs with tibial spurs. Wing-veins with abundant macrotrichiae, present on all veins beyond the cord and on *C*, *Sc*, *R*, *Rs*, *M*, 1st *A*, and 2nd *A* basad to level of arculus and on *Cu* almost to arculus. Venation: *r* faintly indicated, about its own length from the tip of *R*₁ and on *R*₂ beyond mid-length; inner ends of cells *R*₂, *R*₅, and 1st *M*₂ in approximate alignment; basal deflection of *Cu*₁ not far from inner end of cell 1st *M*₂; no indication of vein 3rd *A*; anterior arculus lacking. Transverse impressions on abdominal tergites. Male hypopygium with conspicuous interbases, appearing as a simple chitinized spine (*maorica*) or a

shorter bifid spine (*bispina*). The character of these inter-bases indicates a close relationship with *Epiphragma*.

Genotype, *Limnophila maorica*, Alexander (Maorian Subregion). *L. bispina*, Alexander, likewise belongs here.

NOTHOLIMNOPHILA, gen. nov.

Antennæ short. Pronotum large and conspicuous, especially the scutal region. Mesonotal præscutum with small linear tuberculate pits on the cephalic margin of the sclerite; pseudosutural foveæ conspicuous. Tibial spurs distinct. Wings with the stigma glabrous; macrotrichia on veins basad of cord very sparse or lacking, there being none on *Rs*, *R*₂₊₃, *M*, *Cu*, *Cu*₂, 1st *A*, or 2nd *A*. Venation: *Sc* relatively short, *Sc*₁ ending before the tip of *Rs*; *r* on *R*₂ just beyond the fork of *R*₂₊₃ and on *R*₁ about its own length from the tip; cell *M*₁ lacking; anterior arculus present; vein 3rd *A* lacking. Abdomen with transverse impressions on tergite 2, on the following segments these becoming more oblique in position and less conspicuous. Ovipositor with elongate slender valves.

Genotype, *Limnophila exclusa*, Alexander (Maorian Subregion).

There is some evidence (Ann. & Mag. Nat. Hist. (9) ix. p. 518, 1922) that the genotype may have an aquatic or semi-aquatic larva.

SKUSEOMYIA, gen. nov.

Antennæ 16-segmented; flagellar segments elongate, in the ♀ the verticils approximately equal in length to the segments. Pronotum small and relatively inconspicuous. Tuberculate pits and pseudosutural foveæ apparently lacking. Halteres elongate. Legs with tibial spurs. Wings with *Sc*₂ at tip of *Sc*₁; *Rs* angulated and spurred at origin, beyond the spur straight to beyond mid-length, then bent strongly caudad whence it continues straight to the fork; *r* very far from the tip of *R*₁ and near mid-length of vein *R*₂; *R*₁ beyond *r* about equal in length to cell 1st *M*₂; inner ends of cells *R*₃, *R*₅, and 1st *M*₂ in alignment; basal deflection of *Cu*₁ at the outer end of cell 1st *M*₂, in alignment with *m*; vein 3rd *A* indicated; anterior arculus present. Macrotrichia on veins almost to wing-base, beyond the cord more conspicuous, basad of the cord small and scattered. Ovipositor with the valves short and strongly upcurved.

Genotype, *Skuseomyia eximia*, sp. n. (Australian Subregion).

The chief characters of this group are venational, as the great recession of r from the tip of R_1 , the peculiar course of Rs , and the position of the basal deflection of Cu_1 at the extreme outer end of cell 1st M_2 , in alignment with m . The genus is dedicated to the memory of Frederick A. A. Skuse, whose work on the crane-flies of Australia was many years in advance of his time.

Skuseomyia ezinia, sp. n.

General coloration pale yellow; a black transverse mark across the mesonotum at the suture; wings subhyaline, striped longitudinally and transversely with bright yellow, and sparsely variegated with brown.

Female.—Length 10–10.5 mm.; wing 9.8–10.2 mm.

Rostrum and palpi yellow. Antennæ yellow, the flagellar segments gradually passing into brownish yellow. Head yellow, the frons, centre of vertex, and the genæ more greyish testaceous. Anterior part of vertex between the eyes with a small group of conspicuous erect bristles.

Pronotum and anterior portion of mesonotal præscutum whitish yellow, the latter more shiny posteriorly; transverse suture and anterior two-fifths of each scutal lobe continuously black; posterior sclerite of mesonotum shiny testaceous-yellow. Pleura whitish yellow. Halteres elongate, pale, the knobs slightly darkened. Legs with the coxæ yellowish testaceous; trochanters reddish brown; remainder of the legs yellow, the tarsi passing into brownish yellow distally. Wings subhyaline with a very peculiar bright yellow and brown pattern that is strangely suggestive of that of *Tricyphona kuwanai* and allies of Japan; a narrow brown longitudinal streak occupies cell C for almost its entire length; the yellow areas include cell C ; a broad longitudinal stripe behind vein R , crossing the base of Rs and extending to opposite the curve in the latter vein; an obliquely transverse stripe across the anterior cord and a similar but slightly more infuscated one across the posterior cord, extending from cell R_5 across the outer end of cell 1st M_2 to the wing-margin; a conspicuous yellow stripe follows along vein R_2 from before r around to the wing-tip, bordered outwardly by a grey line that is replaced by brown spots opposite r and at the tip of R_1 , with corresponding brown spots behind the seam; all yellow stripes are narrowly and indistinctly bordered by pale brownish grey; a conspicuous yellow seam along vein Cu ; vein M is conspicuously brown for almost its entire length and Rs on the straight portion basad of the curve; small brown spots at

base of cell R ; at origin of Rs and near mid-length of cell Cu ; veins yellow except where they traverse darkened areas. Venation: Sc long, Sc_1 ending beyond the origin of R_2 ; Sc_2 at its tip; R_{2+3} short, less than m ; cell M_1 a little longer than its petiole; Cu_2 about one-half longer than the basal deflection of Cu_1 ; vein 2nd A elongate.

Abdomen with the basal segments brownish yellow, the tergites with transverse brown markings beyond mid-length of the segments; subterminal segments becoming brown with slightly paler bases and pale apices; genital segment fulvous, the valves of the ovipositor somewhat darker.

Hab. New South Wales.

Holotype, ♀, Richmond River, March 23, 1923 (*V. J. Robinson*).

Paratopotype, ♀, May 8, 1923.

Zelandomyia penthoptera, sp. n.

General coloration brownish black; wings strongly suffused with brown; cell M_1 very small; gonapophyses of male hypopygium slender, bent into a semicircle.

Male.—Length 3.5–3.6 mm.; wing 5.1–5.5 mm.

Rostrum and palpi black. Antennæ black throughout, the flagellar segments oval, with moderately long verticils. Head brownish black, subshiny.

Mesonotum brownish black, without markings. Pleura conspicuously grey-pruinose, the dorsal pleurites brownish black. Halteres elongate, dark brown, the extreme base of the stem obscure yellow. Legs with the coxæ and trochanters obscure testaceous; remainder of legs brownish black, the femoral bases a very little paler. Wings with a strong brown tinge, the stigma slightly darker but poorly delimited; veins dark brown. Venation: Sc_1 ending just beyond the end of Rs , Sc_2 just before its tip; Rs long, gently arcuated; r very faint, about twice its length from the tip of R_1 ; inner ends of cells R_3 , R_5 , and 1st M_2 in oblique alignment; cell M_1 small, approximately one-half its petiole; basal deflection of Cu_1 not far from the inner end of cell 1st M_2 .

Abdomen brownish black, the sternites slightly paler. Male hypopygium with the basistyles relatively long; outer dististyle slender, chitinized, the apex weakly bifid; inner style fleshy, shorter than the outer style, tapering from the broad base. Gonapophyses very slender, bent into a semicircle, directed laterad, the acute points cephalad.

Hab. New Zealand (North Island).

Holotype, ♂. Ohakune, altitude 2060 feet, March 23, 1923 (T. R. Harris).

Paratopotypes, 2 ♂♂, March 31–April 6, 1923 (T. R. Harris).

Gynoplistia hiemalis (Alexander).

1923. *Cerozodia hiemalis*, Alexander, Ann. & Mag. Nat. Hist. (9) xi. p. 108.

This species was based on a single female, and was placed rather tentatively in *Cerozodia* with the indication that the discovery of the male sex might necessitate its removal to *Gynoplistia*. During the past season, Harris found the male sex of this insect. Although it rivals in size the known species of *Cerozodia* and has nearly apterous females, as is the case in most species of the latter genus, the structure of the antenna proves that it should be placed in *Gynoplistia*, in which genus it ranks as the largest and most beautiful species so far discovered. It is most nearly related to the smaller *G. ocellifera*, Alexander, which is likewise a winter species, and will undoubtedly be found to have a subapterous female. The male of *G. hiemalis* was found by Harris on June 14, 1923, at Ohakune. On June 22, 1923, a second male was discovered.

Gynoplistia myersæ, sp. n.

Related to *G. conjuncta*, Edwards; general coloration grey, the præscutum with four brown stripes; antennæ with short pectinations; legs black, the femoral bases paler; subterminal pale rings on femora almost obliterated; wings yellowish subhyaline with a sparse brown pattern.

Male.—Length 11–12 mm.; wing 10–11 mm.

Rostrum grey with abundant black setæ; palpi dark brown. Antennæ black throughout; 16-segmented, the formula being 2+2+7+5, all of the pectinated segments being nearly in alignment; flagellar branches short, the longest less than three times the length of the segment that bears it. Head dull grey, the vertex infuscated, but further divided by a capillary grey median line.

Pronotum dark brown, grey-pruinose. Mesonotal præscutum yellowish grey with four conspicuous bright brown stripes, the narrow intermediate pair not attaining the suture, the broader lateral stripes beginning immediately behind the conspicuous black pseudosutural foveæ; scutum grey, the lateral margins of the lobes weakly infuscated;

scutellum light grey; postnotum light grey, the pleurotergite variegated with darker. Pleura light grey, indistinctly variegated with blackish. Halteres yellow, the knobs conspicuously dark brown. Legs with the coxæ brownish grey; trochanters yellow; femora black, their bases rather narrowly fulvous; a very indistinct fulvous subterminal ring that is almost obliterated on the fore legs, more distinct on the posterior femora; remainder of legs brownish black. Wings yellowish subhyaline; cells *C* and *Sc* more yellowish; disk with a sparse brown pattern; stigma oval, brown, connecting with a brown seam along the cord, the latter most extensive in cells *R*₂ and *R*₃; outer end of cell 1st *M*₂ narrowly seamed with brown; a small brown cloud at fork of *M*₁₊₂; a cloud at base of cell *R* and a conspicuous circular or oval spot at origin of *Rs* in cells *R* and 1st *R*₁; an indistinct seam along vein *Cu*; veins dark brown. Venation: *Rs* long, angulated and spurred at origin; *r-m* distinct, subequal to *r*; cell *M*₁ nearly twice its petiole; basal deflection of *Cu*₁ near mid-length of cell 1st *M*₂.

Abdomen dark grey, the hypopygium more reddish. Male hypopygium with the ninth tergite slightly projecting, bifid, each half squarely truncated; basistyles relatively short and stout, the dorsal surface provided with abundant coarse yellow setæ; mesal face at base produced into a conspicuous blackened beak, the point directed cephalad; outer dististyle with a flat darkened apex that is delicately toothed, just before the apex on the anterior margin with a powerful, acute, appressed spine; before this spine the outer margin bears a series of coarse erect bristles; inner dististyle broad at base, the distal third suddenly narrowed, the surface of style with abundant setæ. Gonapophyses with the distal half nearly straight, appearing as narrow flattened blades. Ædeagus curved at apex, the margins smooth.

Hub. New Zealand (South Island).

Holotype, ♂, Mt. Rolleston, Canterbury, altitude 4500 feet, January 6, 1923 (*I. Myers*).

Paratopotype, ♂.

This interesting fly is named in honour of the collector, Mrs. John G. Myers.

Gynoplistia subclavipes, sp. n.

General coloration shiny black; antennæ 15-segmented, the branches moderately elongate; coxæ, trochanters, and femoral bases obscure yellow; wings subhyaline with a heavy brown pattern; abdomen violaceous black, the

genital segments yellow ; male hypopygium with the outer dististyle toothed before apex ; gonapophyses very long and slender.

Male.—Length about 8.5 mm.; wing 7.2 mm.

Female.—Length 9–9.4 mm.; wing 8–8.4 mm.

Rostrum shiny black ; palpi brown. Antennæ 15-segmented, the formula being 2+2+6+5 ; coloration black throughout ; longest branch (on segment 6) approximately one-half the length of flagellum ; in the female the basal two or three flagellar segments are weakly produced, the following segments soon passing into oval. Head shiny coal-black.

Pronotum and mesonotum shiny coal-black, the humeral region and the scutellum more reddish ; in the female the reddish colour of the præscutum is more extensive. Pleura shiny black, the sclerites surrounding the wing-base more reddish ; dorsal pleurites with a narrow line of appressed grey pubescence. Halteres obscure yellow, the knobs infuscated. Legs with the coxæ and trochanters obscure yellow ; remainder of the legs black, the femoral bases broadly obscure yellow, these pale bases narrowest on the fore legs, broadest on the posterior legs where approximately the basal half is included ; femora strongly clavate, especially the elongate posterior femora. Wings subhyaline, with a heavy brown pattern ; cell *Sc* infuscated ; a conspicuous cloud at origin of *Rs*, crossing cell *R'* ; a conspicuous band along the cord, extending from the slightly darker stigma across the wing, the centre of cell 1st *M*₂ restrictedly pale ; wing-tip broadly darkened, including all of cell *M*₁ ; brown suffusions in the basal half of cell *Cu* and the outer ends of cells 1st *A* and 2nd *A* ; veins black. In the female the pattern is rather more restricted, especially as regards the clouding at wing-tip and in the cubital and anal cells ; base of cell *M* darkened. Venation : *Rs* long, strongly angulated at origin ; veins *R*₂ and *R*₃ strongly divergent ; a small spur from *M*₃ jutting into cell 1st *M*₂ at its distal end ; cell *M*₁ about equal to its petiole ; basal deflection of *Cu*₁ just before mid-length of cell 1st *M*₂ ; vein 2nd *A* bent strongly to margin at distal end.

Abdomen violaceous-black, the hypopygium and ovipositor yellowish. Male hypopygium with the basistyles stout, the mesal margin expanded into a flattened blade whose distal angle is produced and weakly toothed ; apex of each basistyle produced into two flattened blades, one weakly serrulate at apex, the other smooth, obliquely subtruncate. Outer dististyle slender, with a conspicuous tooth on outer margin

far before the apex, this apex microscopically denticulate but pale; outer style with numerous small setæ and about three larger bristles on outer margin before apex. Gonapophyses very long and slender, tapering gradually to the acute tips, extending to opposite the level of the tips of the basistyles. Ædeagus small and slender.

Hab. New Zealand (North Island).

Holotype, ♂, Ohakune, altitude 2060 feet, December 17, 1922 (*T. R. Harris*).

Allotopotype, ♀.

Paratopotype, ♀.

Tricyphona arthuriana, sp. n.

Male.—Length 7·2 mm; wing 9·3 mm.

Generally similar to *T. novæ-zelandiæ*, Alexander, from which it differs as follows:—Antennal scape concolorous with the flagellum. Mesonotal præ-cutum brownish grey with four very faintly indicated darker stripes, the median capillary pale vitta broader. Pleura conspicuously dark grey. Legs darker brown, the femoral tips markedly infuscated. Wings more strongly infuscated. Venation: *r-m* beyond mid-length of the petiole of cell *R*₄; *m* connecting with *M*₂ about its own length beyond the fork of *M*₁₊₂. Male hypopygium dark brown. Interbasal process of hypopygium straight, broad-based, the apex a little produced mesally, blunt. Ædeagus with a V-shaped median notch. In *novæ-zelandiæ* the interbase is a gently curved hook; the ædeagus terminates in a blackened globular median lobe.

Hab. New Zealand (South Island).

Holotype, ♂, Arthur's Pass, Canterbury, altitude 3000 feet, December 24, 1922 (*J. G. Myers*).

Habromastix robinsoni, sp. n.

General coloration brownish black, the abdomen conspicuously orange-rufous; wings strongly infuscated, more suffused at the base, in the costal region, and along vein *Cu*.

Female.—Length 20·5 mm.; wing 19·3 mm.

Rostrum and palpi dull black. Antennæ with the basal scapal segment testaceous, tipped with darker; second segment testaceous; flagellum black; flagellar segments elongate, a little longer than the thorax alone. Head velvety-black.

Mesonotal præscutum dark brown, with four velvety-black stripes, the intermediate pair long, separated from one

another by a relatively broad line of the ground-colour; lateral stripes narrow, removed from the intermediate stripes, which are strongly narrowed toward the suture; remainder of the mesonotum dark brown, the scutal lobes darker medially; scutellum and base of postnotal mediotergite paler brown. Pleura brown, variegated with velvet-black, especially on the anterior pleurites. Halteres slender, infuscated, the knobs more strongly so. Legs with the coxæ brown; trochanters obscure brownish yellow; remainder of legs testaceous-brown, apparently not fully coloured. Wings with a strong brownish tinge, the base and costal region more suffused; stigma dark brown; a brownish seam along the anterior cord and along vein *Cu*; veins dark brown. Venation: *Rs* a little shorter than *R*₂₊₃; petiole of cell *M*₁ not much longer than *r-m*; cell 1st *M*₂ relatively large; fusion of *M*₃ and *Cu*₁ about equal to *r-m*, just before mid-length of cell 1st *M*₂; cell 2nd *A* moderately broad.

Abdomen with the basal segment infuscated; remainder of abdomen orange-rufous, only the basal and dorsal shields of the ovipositor shiny black. Ovipositor with the valves straight, orange-horn colour.

Hab. New South Wales.

Holotype, ♀, Rous, Richmond River, May 8, 1923 (*V. J. Robinson*); flying at dusk in scrub.

This striking and very distinct species is named in honour of the collector, Mr. V. J. Robinson.

Habromastix platyoxantha, sp. n.

Male.—Length about 14 mm.; wing 15·8 mm.

Closely related to *H. terræ-reginæ*, Alexander (Queensland), from which it differs as follows:—

General coloration darker. Frontal prolongation of the head brown, slightly paler dorso-medially. Flagellum entirely dark brown. Vertex largely dark brown. Intermediate præscutal stripes reaching the anterior margin of the sclerite. Pleura not so conspicuously variegated with brown. Wings with the ground-colour darker brown, the pale markings narrower and clearer-cut, especially the areas in the basal and anal cells; spots in the cells beyond the cord for the most part reduced to mere flecks. Venation: *Rs* less arcuated; basal deflection of *R*₄₊₅ and *r-m* subequal; petiole of cell *M*₁ about equal to *m*. Abdominal tergites without a dorso-median pale vitta, the sclerites being dark brown with very broad and conspicuous golden-yellow triangles at the caudal-lateral angles; sternites largely

obscure yellow; hypopygium black. Male hypopygium with the basistyles longer and more slender, distinctly constricted near two-thirds their length; chitinized dististyle tapering more gradually into the flattened chitinized apex; pale dististyle more pointed at apex.

Hab. New South Wales.

Holotype, ♂, Rous, Richmond River, May 8, 1923 (*V. J. Robinson*).

Macromastix (Phymatopsis) tenuirostris, sp. n.

General coloration of præscutum brownish yellow, with four narrow brown stripes; frontal prolongation of head long and slender, nasus lacking; vertical tubercle elongate, directed cephalad; thoracic pleura light grey; legs black, the femoral bases a little paler; wings faintly tinged with brown; cells *C* and *Sc* dark brown; *Sc*₁ persistent; cell *R*₂ large; cell *M*₁ barely sessile.

Male.—Length about 11 mm.; wing 13 mm.

Frontal prolongation of the head long and relatively slender, dark brown throughout, about one-third longer than the remainder of the head, the dorsum on distal third weakly setiferous; nasus lacking or rudimentary; palpi dark brown. Antennal scape dark brown; flagellum broken. Vertical tubercle long and conspicuously appressed, directed cephalad, extending to opposite the end of the first scapal segment, reddish brown in colour; vertex dark, covered with a dull brownish-yellow pollen, especially laterally.

Mesonotal præscutum brownish yellow with four narrow, dark brown stripes, the interspaces behind light grey, restricting the diameter of the lateral stripes; scutal lobes dark grey, the median area paler; scutellum reddish grey, narrowly darker medially; postnotum light grey, a little less than the posterior half infuscated. Pleura light grey, the anterior pleurites darker. Halteres long and slender, the stem yellowish brown, the knobs darker brown. Legs with the coxæ dark grey; trochanters pale basally, the apices conspicuously dark brown; legs black, only the femoral bases narrowly paler. Wings with a faint brownish tinge; cells *C* and *Sc* abruptly and conspicuously dark brown; stigma obscure yellow; wing-base and apex a little suffused with yellowish. Venation: *Sc*₁ persistent, ending shortly before the fork of *Rs*, *Sc*₂ a short distance from the tip of *Sc*₁; *Rs* long, gently arcuated, dividing with a wide-spreading fork; tip of *R*₁ faint; *r* on *R*₂ about two-thirds its length beyond the origin; *R*₄₊₅ ending just beyond the wing-apex; *r-m* elongate; cell *M*₁ barely sessile; cell

1st M_2 relatively large; basal deflection of Cu_1 and M_3 in punctiform contact; cell 2nd A moderately broad.

Abdomen with the basal tergite pale; remainder of abdomen brownish black, sparsely pruinose. Male hypopygium shiny chestnut-brown; ninth tergite relatively short, the posterior margin with a U-shaped median notch, the broad lateral lobes obtusely rounded; remainder of hypopygium projecting conspicuously beyond the tergite, somewhat as in the *impudica* group of the genus *Tipula*.

Hab. New South Wales.

Holotype, ♂, Tarce, December 7, 1922 (*E. W. Ferguson*).

It seems best to consider *Phymatopsis*, Skuse, as being a subgenus of *Macromastix*. The known females of species of this group are subapterous. The type has been returned to Dr. Ferguson.

Macromastix (Phymatopsis) nigrosubcostata, sp. n.

General coloration ashen-grey; præscutum with four brownish-grey stripes; femora and tibiæ brownish yellow, the tips narrowly blackened; wings greyish yellow, the basal half of cell *Sc* and the wing-base brownish black; abdominal segments yellow, the caudal margins of the sclerites dark brown, the tergites, in some cases, with a continuous dorso-median stripe.

Male.—Length 12–14 mm.; wing 14–16 mm.

Frontal prolongation of the head brownish black, palpi concolorous. Antennæ short, pale brown, the flagellar segments subcylindrical. Head yellowish grey, the centre of the vertex infuscated and with a capillary black median line extending on to the vertical tubercle, the latter flattened but conspicuous, fulvous.

Mesonotal præscutum dull grey, with four rather indistinct darker brownish-grey stripes, the intermediate pair strongly narrowed posteriorly and becoming obsolete before the suture; anterior-cephalic margin of præscutum back to the pseudosutural foveæ narrowly dark brown; remainder of mesonotum light ashen-grey without markings. Pleura brownish grey, with indications of brown stripes. Sternum concolorous. Halteres obscure yellow, the knobs dark brown. Legs with the coxæ obscure yellow, the extreme bases a little darker; trochanters obscure yellow; femora brownish yellow, the tips narrowly but conspicuously blackened; tibiæ pale brownish yellow, the tips blackened; tarsi black, the bases of the metatarsi a little paler. Wings greyish yellow, the costal cell and distal half of the subcostal

cell yellow; prearcular region and basal half of subcostal cell brownish black; stigma pale brown; area behind vein *Cu* yellowish; veins pale brown. Venation: *Sc*₁ preserved basally, the extreme tip atrophied; cell *M*₁ sessile.

Abdominal tergites obscure yellow; basal tergite faintly pruinose; in fully coloured specimens, a conspicuous dark brown median stripe that is sometimes entire, sometimes interrupted at the basal half of each segment to form broad apical triangles; lateral margins of tergites narrowly darkened; sternites with the basal portions, or at least basal lateral triangles, yellow, the remainder of the segments dark brown. Male hypopygium with the ninth tergite dark brown, the basistyles more yellowish brown.

Hab. New South Wales.

Holotype, ♂, Rous, Richmond River, May 8, 1923 (*V. J. Robinson*).

Paratopotypes, 2 ♂ ♂; 3 ♂ ♂, August 1923.

Macromastix sessilis, sp. n.

Head orange-fulvous, with a narrow dark brown median vitta; mesonotal præscutum orange-brown with four brown stripes; wings subhyaline, stigma brown; cell *M*₁ sessile; abdominal segments feebly bicolorous.

Male.—Length about 7·8 mm.; wing 11·3 mm.; antenna about 3 mm.

Frontal prolongation of the head moderately elongate, dark above, the sides and venter more yellowish; palpi dark brown. Antennæ moderately elongate, about as long as the combined head and thorax; scape dull ochreous; flagellum dark brown; flagellar segments elongate-cylindrical. Head orange-fulvous, passing into yellow on the front, with a narrow distinct dark brown median stripe passing cephalad on to the compressed vertical tubercle.

Mesonotal præscutum orange-brown with four distinct brown stripes, the intermediate pair narrowly and indistinctly separated by a pale vitta; scutal lobes with dark centres; scutellum brownish grey; postnotum golden with two dark brown areas at the posterior margin of the mediotergite. Pleura yellowish ochreous, the dorsal pleurites a little infuscated; a small brown area on pleurotergite in front of halteres. Halteres pale brown, the extreme base of the stem pale. Legs with the coxæ and trochanters yellowish; femora obscure yellow or brownish yellow, the tips narrowly infuscated; tibiæ and tarsi dark brown, the bases of the former narrowly pale. Wings subhyaline;

cell *Sc* a little darker; stigma conspicuous, brown; veins dark brown. Venation: *Rs* shorter than *R*₂₊₃, straight; inner ends of cells *R*₃ and *R*₅ in oblique alignment; cell *M*₁ sessile; *m-cu* punctiform; cell 2nd *A* relatively short and narrow.

Abdominal tergites brown, the caudal margins of the segments narrowly darker brown, the basal lateral triangles golden-pollinose; sternites obscure yellow, the lateral margins of the segments infuscated; hypopygium light brown.

Hab. New Zealand (North Island).

Holotype, ♂, Ohakune, altitude 2060 feet, May 10, 1923 (T. R. Harris).

XLVII.—*Ants from Sumatra*. By W. C. CRAWLEY, B.A., F.E.S., F.R.M.S. *With Biological Notes by* EDWARD JACOBSON.

Subfamily I. *PONERINÆ*.

Chrysapace, gen. nov.

♀. Apterous. Head truncate behind the ocelli, forming a plane surface almost at right angles to the vertex, the lateral angles bluntly bordered. Mandibles broad and triangular. Frontal carinæ joined to the clypeus, rising high between the articulations of the antennæ, and gradually narrowing to a point at a distance equal to three times their width at the widest, where they abruptly converge and terminate. Antennal fossæ limited laterally by a carina as in *Cerapachys*.

Antennæ 12-jointed, the funicular joints gradually thickening to the apex, the last four joints thickening more rapidly, but not forming a club; the apical joint is longer than the preceding two together. Eyes well developed, placed posteriorly.

Thorax large and massive, without a trace of sutures.

Pronotum with a sharp anterior border.

Petiole and postpetiole bordered anteriorly but not laterally, the latter separated from the following segment by a deep constriction.

The basal segment of gaster covers more than half the whole gaster.

Pygidium truncate, oval, bordered along the apical half, which is spinulose.

This genus comes near *Cerapachys* and *Phyracaces*. Taking the characters given in Emery's table (Gen. Insect. *Ponerinæ*), it differs principally from *Sphinctomyrmex* in not having the segments of the gaster separated from each other; from *Cerapachys* in not having an antennal club formed by the apical joint; and from *Phyracaces* in not having the petiole bordered.

The sculpture is remarkable.

Chrysapace jacobsoni, sp. n. (Fig. 1.)

♀. Length 7 mm.

Black; apices and terminal border of mandibles, the anterior portion of frontal carinæ, base and apex of scape, the tarsi, the dorsal surface of tibiæ, the trochanters, and articulations of femora castaneous-red; funiculi reddish brown.

Head and body with a sparse golden pilosity, antennæ and legs with abundant erect hairs. Pubescence nil, except on funiculi.

Head as broad as long, broadest behind, narrowing somewhat rapidly in front of the eyes. Mandibles with a broad edentate terminal border, apex with a blunt double tooth. Clypeus slightly concave, depressed along its slightly convex anterior border. Frontal carinæ feebly emarginate behind the centre. Eyes moderately large, prominent, placed at the posterior angles of the head just before the truncated portion. Ocelli small, situate at the anterior border of the truncation, just above the level of the eyes. A faint ridge extends from the end of the frontal carinæ to the anterior ocellus.

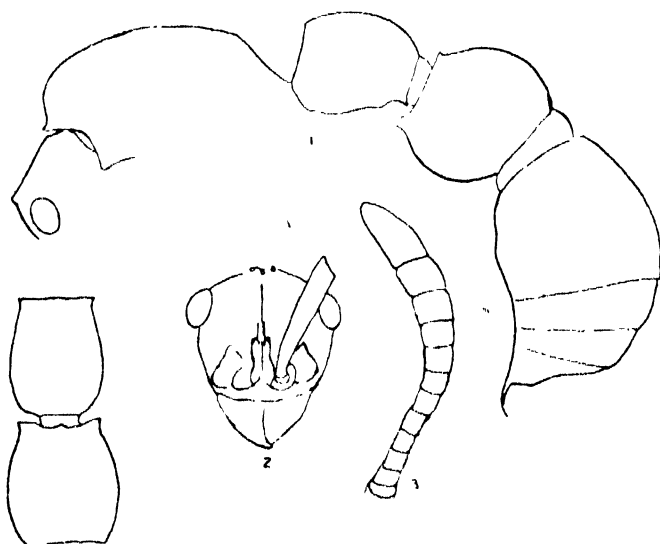
Carinæ of cheeks with a blunt margin, forming an acute angle posteriorly. The anterior extremity is raised and thickened. The carina extends from the anterior border of the antennal fossa, turns inwards after the thick and rounded anterior lateral angle, continues in a straight line to the posterior angle, which is nearly on a level with the termination of the frontal carinæ, then descends obliquely, terminating in the centre of the upper margin of the antennal fossa. It is more prominent than in any species of *Cerapachys* or *Sphinctomyrmex* with which I am acquainted. Occipital border concave. The entire neck is encircled with a sharp border.

The scape gradually thickens from base to apex, where

it is not quite twice as thick ; it reaches to the top of the ocelli. Funiculus twice as long as scape (v. characters of genus).

Thorax very massive, evenly convex in both directions. The sharply bordered anterior margin of the pronotum is continued laterally in an S-shaped curve, ending in a blunt angle below. From above the thorax is slightly narrower in front, the sides convex for their posterior two-thirds. Declivity of epinotum feebly concave.

Fig. 1.



Chrysapace jacobsoni.

1. Side view of body.
2. Front of beak.
3. Funiculus (on slightly larger scale).
4. Pedicel from above.

Petiole from above nearly once and a half as long as broad, slightly broadening posteriorly to a point about one-sixth from the end, where it narrows rapidly to its bordered extremity, which is more than one-half as wide as the anterior extremity, which is also bordered. In profile the anterior border is truncate, the upper surface convex, descending rapidly posteriorly. Postpetiole from above as broad as long, broader posteriorly, the sides convex. Anteriorly it is

bordered, the border forming a small tooth in the centre and at each side. In profile it is very thick, convex above and below, produced anteriorly beneath into a blunt process.

First segment of gaster proper longer than the remainder, broadest in front. The rest of the gaster narrows rapidly to its apex.

Sting large.

Moderately shining; entire body deeply and regularly striate, somewhat similarly to some species of *Diacamma*, but more deeply and regularly. Mandibles finely striate, except the apex and terminal border; the striæ are coarser on the outer border and interspersed with one or two irregular punctures.

Head from articulations of antennæ to ocelli regularly transversely striate, the striæ interrupted by the central line. There are a few piligerous points on the ridges of the striæ. The number of striæ on this portion of the head is 14. From the ocelli to the occipital border the striæ curve towards the lateral angles, the central ones being longitudinal. On the sides of the head they curve upwards from the genal carinæ to the border of the neck.

On the pronotum the striæ are transversely arched, starting from the transverse anterior as a base, the central stria forming a loop. On the part corresponding to the mesonotum the striæ diverge anteriorly from the centre. The base of epinotum is striated similarly to the pronotum. On the declivity the rounded cord-like ridges are flattened. Petiole and postpetiole longitudinally striate, the striæ curving slightly outwards from base to apex. On the petiole the upper surface of the ridges is bluntly angulate, instead of round as on the thorax and head, and on the postpetiole the upper edge is acute. Remaining segments of gaster longitudinally striate, the ridges being broad and flat, so that the surface appears to have narrow grooves cut into it, instead of ridges standing out from it.

Scapes with irregular longitudinal punctures. Legs smooth and shining.

A single ♀, Suban Ajam (*Benkeulen*), Sumatra (No. 6), July 1916. W. C. C. coll.

Stictoponera costatum, Em. ♂, Fort de Kock, 1913.
920 metres.

Stictoponera menadensis, Mayr. ♂, Fort de Kock, 1922.

Odontoponera transversa, Sm. ♂ ♀, Fort de Kock; Padang; Tamiai; Serapai; Kalung; Buo, etc., 1913-1922.

Diacamma holosericum, Rog. ♂, Rimbo Pengadang.

Diacamma rugosum, Le G., race *sculpturatum*, Sm. ♂, Muara Kiawe.

Pachycondyla (*Bothroponera*) *tridentata*, Sm. ♂, Fort de Kock; Andalus, 1922.

Pachycondyla (*Ectomomyrmex*) *astutus*, Sm. Fort de Kock.

Euponera (*Brachyponera*) *luteipes*, Mayr. ♂ ♀, Fort de Kock, Oct. 1913.

Trapeziopelta nitida, sp. n. (Fig. 2.)

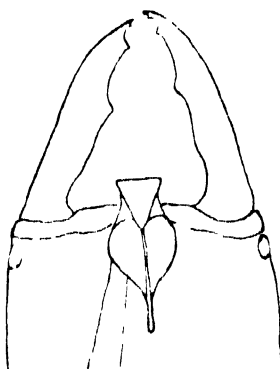
♂. Length 3.5 mm.

Dark castaneous (mahogany-colour); mandibles, antennæ, and legs paler; 1st and 2nd segments of gaster with a dark patch across centre. A fairly plentiful yellow pilosity over whole body, including legs and antennæ, longest and thickest at apex of gaster. The clypeal process has two pairs of long hairs. There is a short pubescence on upper surface of head.

Head rectangular, slightly broader than long, a fraction narrower behind; the occipital border widely and shallowly concave, the angles rounded. Frontal groove well defined. Eyes placed less than their length from the articulation of the mandibles, oval, consisting of about 16 facets. Process of clypeus in the form of an equilateral triangle, very slightly broader than long, the base of the triangle in front, where the border is straight. Mandibles long and narrow, nearly as long as the head. Seen from the side they are narrow at the base, gradually widening on the inner side to a point beyond the halfway line, where is a tooth; from this point the sides are parallel to a point more than halfway to the apex, forming another tooth; the remainder forms an oblique terminal border with two small teeth at the apex. The outer border is uniformly concave. The mandibles enlarge gradually, not abruptly as in *bidens*. From the side of the base of the mandible a narrow groove runs, curving slightly downwards and continuing along the extreme edge of the mandible for more than two-thirds of its length. Club 4-jointed; the 1st joint of funiculus more than twice as long as the 2nd, and the last about equal to the two preceding ones. The scapes are only half as thick at the base as at the apex: they just fail to reach the centre of the occipital border.

Pronotum (without neck) as broad as long, the sides parallel, the posterior border concave. Mesonotum twice as broad as long. Base of epinotum twice as long as broad, rectangular, in profile rounding evenly into the declivity, which is less than half as long, flat in the centre, concave at each side, forming two lateral angles. The mesoepinotal suture forms a slight incision in the back of the thorax. From above the node is slightly broader than long, widest behind where it is straight, the anterior angles rounded. In profile it is slightly concave in front, straight behind, and moderately rounded above. The second segment of the gaster is longer than the first, the constriction between moderately deep. Smooth and shining. The mandibles with a few small points; the upper surface

FIG. 2.

Front of head and mandibles of *Trapeziopelta nitida*.

of head with small punctures, close together and small in front, larger and more separated behind. Frontal carinae punctured. Thorax and node with a few small points, and the gaster with less.

Fort de Kock, 1922 (143). Type, W. C. C. coll.

In size, shape of mandibles and of the clypeal process, and position of eyes is distinct from *bidens*, Em., which it otherwise resembles. From *emeryi*, For., it differs in having the first tooth nearer the middle of the mandible, in the broader head, slightly different clypeal process, and in having the occipital border concave. The mandibles of *nitida* approach more nearly to those of *emeryi* than to those of *bidens*.

Trapeziopelta mandibularis, sp. n. (Fig. 3.)

♂. Length 6.5 mm.

Dark castaneous; funiculi paler, apex of gaster darker. A plentiful pale yellow pilosity spread over the body, legs, and antennæ, most abundant on apex of gaster. Pubescence almost nil. Mandibles broad and short, somewhat like those of *modiglianii*, Em., narrow at base, swelling rapidly to near the halfway distance, where is a strong tooth; then curving inwards for a little more than half of the distance to the apex, forming another strong tooth; the edge between this point and the apex is oblique, with two well-defined small teeth besides the apical one. A narrow sulcus runs across the base of the mandible underneath and down the extreme lateral border of the apex. Clypeal process very similar to that of *modiglianii*, broader than long,

Fig. 3.

Mandible of *Trapeziopelta mandibularis*.

with a tridentate anterior border. The three teeth are small and obtuse, and the centre one does not project as in *modiglianii*.

Head as long as broad, equally broad in front and behind, sides slightly convex, posterior angles rounded, occipital border concave. Eyes moderately large, situate their length from the base of the mandibles. The scape reaches to less than its breadth from the occiput. Frontal groove well marked and deep. Joints 3-9 of scape as broad or broader than long, the apical nearly equals the three preceding ones. There is no distinct club.

Pronotum as broad as long without the neck. Sutures well marked, that between the mesonotum and epinotum showing a slight incision in profile. Base of epinotum $1\frac{1}{2}$ as long as the declivity, fairly flat with an evenly rounded angle between. From above the base is not quite

twice as long as broad. It has a faint longitudinal groove down the centre. Declivity slightly concave in the centre. Node from above as broad as long, widest behind, the sides feebly convex, all the angles rounded, the anterior ones more than the posterior. First segment of gaster almost the same shape as the node, but larger, the constriction between it and the second segment very deep.

Smooth and shining. A few small punctures on the mandibles and scapes. Frontal carinae and head with scattered punctures, larger and more elongate at the occiput. Thorax, node, and first segment of gaster have similar but larger punctures, some elongate. The second segment has a few small points.

A single ♀. Gunung Dempu, 1400 metres, 1916 (1265). Type, W. C. C. coll.

Like *modigliani*, Em., differing in colour, size, and shape of mandibles, which are even broader.

Leptogenys (Lobopelta) diminuta, Sm., var. *fruhstorferi*, Em.

♂ ♀ ♂, Fort de Kock, Tamiai, 1915, 1921.

♂. Length 5.5 mm.

Dark brown; mandibles, antennae, legs, basal segments of gaster and genitalia brown; margins of segments of gaster testaceous. Wings pale brown and iridescent; nervures darker.

Body, including antennae and legs, with moderately long erect hairs, shorter on antennae and legs, and most abundant on apical segments of gaster and tips of stipites. Antennae fairly pubescent, legs less so.

Mandibles small and short, half as long as the distance between their tips, twice as long as broad, the points rounded. Clypeus large and rounded, the anterior border slightly sinuate. Head almost circular; eyes very large, occupying nearly the whole of the sides and almost reaching the base of mandibles. Scapes nearly three times as long as the first joint of funiculus, the second longer than the first plus the scape. The remaining joints gradually diminish till the apical, which is about one-quarter longer than the previous one.

Mesonotum separated from the scutellum by a deep sulcus. Base of epinotum feebly convex in both directions. Node round at apex, where it is narrower than at the base; from above it is narrower and rounded in front, broad and straight behind. There is a slight constriction between the 1st and 2nd segments of the gaster.

Genitalia.—Stipes broad and pointed, swelling above the tip on the upper side into a broad tooth. The apex is curved inwards. Volsella and lacinia short, not reaching so far as the angle of the stipes, consisting of three parts, the inner flat and broad, narrowing abruptly at the apical third into a slender elongate point, ventral; the broad portion is terminated above by a blunt angle. The median part is longer and spatulate at the apex, dividing halfway down to form the outer part, which is simple and rounded at apex. Sagittæ long, twisted half over near the apex and curving outwards, enclosing the volsellæ and nearly touching the stipites. They have a series of small back-pointed teeth round the apex and inner border. Sensoria on the stipites and outer double part of volsellæ.

Clypeus shining, with a few irregular punctures. Head shining; there are a few wrinkles between the ocelli. Pronotum encircled with fine striæ. Anterior portion of mesonotum smooth with irregular elongate punctures, the remainder irregularly longitudinally rugose with elongate punctures. Mayrian furrows transversely ridged; sulcus of mesonotum longitudinally ridged. Scutellum evenly striate longitudinally. Epinotum shining with irregular punctures. The rest shining.

♀ (not described). Length 8 mm.

Apterous, ergatoid. Larger than the ♂. Colour similar, but the entire scape ferruginous and the legs more uniformly ferruginous.

There is a small but distinct anterior ocellus, and two microscopical depressions representing the others. The node is shorter and more rounded anteriorly in profile than in the ♂. Gaster very large, as long as the head and thorax together, and swollen.

Striation of thorax more regular, otherwise like the ♂.

1 ♀. Tamiai, July 1915. (5468). Type, W. C. C. coll.

Leptogenys (Lobopelta) iridescens, Sm. ♂, Sungai Kumbang.

Odontomachus latidens, Mayr. ♂, Suban Ajam.

Odontomachus hæmatoda, Ltr. ♂ ♀, Sumatra (Padang).

Odontomachus rixosus, Sm. ♂, Aur; Rimbo Pengadang.

♀ (not described). Deälate. Length (without mandibles) 12 mm.; mandibles 2 mm.; head 3.4 mm.; width of head at eyes 2.4 mm.

Brown; mandibles and antennæ red-brown, legs yellow, tibiæ and tarsi darker. Head as in ♂, but more robust; depression on vertex above ocelli with faint radiating striæ.

Pronotum semicircularly transversely striate, scutellum smooth and shining, and epinotum coarsely, transversely striate. Otherwise like ♂.

Rimbo Pengadang, June 1916 (21). Type, W. C. C. coll.

Though not taken with ♂ ♂, there can be little doubt that this is the female of *rixosus*.

Subfamily DORYLINÆ, Leach.

Anictus aitkeni, For., var. *dentata*, For. ♂, Aur, 1914.

These ants were observed as they were coming out of a hole in the ground, making an invasion in a native house. A continuous stream of thousands of workers was pouring forth, marching in a column of 3 to 4 individuals side by side, along the posts of the house to the roof. The aim of this expedition was to rob a nest of another ant, *Pheidole plagiaria*, Sm., of their eggs, larvæ, and pupæ. The victims made no resistance whatever, but fled to the remotest parts of the roof, carrying away as many of their brood as they were able to save. They were, however, robbed by their enemies, who pursued them everywhere. The predatory ants set out at 7 P.M. and returned to their hole about noon, laden with their spoil. No imagines of the *Pheidole* were taken.

Subfamily MYRMICINÆ, Lcp.

Metapone jacobsoni, sp. n.

♀. Length 6.4 mm.

Black; mandibles dark red-brown, funiculus, extremities of scapes, the tibiæ and tarsi, parts of femora, and the apex of gaster castaneous. Gaster very dark brown, almost black.

Body moderately provided with a short pilosity interspersed with a few longer hairs, most abundant at apex of gaster. The gaster in addition has a sparse pubescence. Mandibles short and broad, the internal and external borders almost straight and subparallel, armed with five teeth, the apical long and pointed, the two following shorter and less pointed, the two basal ones blunt and indistinct.

Head long and narrow, nearly $1\frac{1}{2}$ as long as broad, the sides parallel, feebly contracted in front of eyes, the occipital border shallowly emarginate. The clypeus slightly depressed

in the centre of the anterior border, which is produced in a short, feebly emarginate lobe; the posterior suture almost effaced. Antennal club 3-jointed, the apical not quite equalling the two preceding. Eyes large and flat, behind the middle line. There is a slight depression representing the frontal area, but no indication of a frontal groove.

Sides of pronotum submargined, the shoulders feebly angular. Declivity of epinotum short and vertical. From above the epinotum is widest in front, nearly as broad as long, narrowing behind to half this width. Node of petiole from above nearly 1.3 as long as broad, very slightly wider behind, where it is widely emarginate, with blunt angles; the sides subparallel and sub-bordered. In profile it is vertical in front, feebly convex along the top, behind with a blunt triangular tooth on each side (seen as a blunt angle from above). Stalk about half as long as the node. Underneath is a flat lamella ending in a small tooth in front. Postpetiole from above about as broad as long, straight in front, the sides convex, behind with blunt lateral angles. In profile it is vertical in front and convex above, beneath with an anterior transverse ridge bearing several long hairs.

Gaster long and narrow, sting exerted.

Shining; mandibles with a series of coarse elongate punctures along the masticatory border, the rest with a few smaller circular punctures. Whole of head finely and longitudinally striate, the striæ regular, here and there interspersed with small points. Scrobe more finely and regularly striate than the rest of head. Scapes smooth with a few small points. Whole of thorax and epinotum striate in a similar manner to the head; the node has irregular striæ curving round its anterior border, and is interspersed with points. Postpetiole and gaster finely shagreened. Legs smooth, with traces of ground reticulation.

2 ♀ ♀. Fort de Kock, Apr. 1914; Oct. 1914. Nos. 153, 1223. The other ♀ is 7 mm. long, and has the cheeks and clypeus coloured like the mandibles; the gaster is also slightly less dark than in the type.

Type, W. C. C. coll.

Sima (Tetraponera) allaborans, Walk., subsp. *crassiuscula*, Em. ♀, Fort de Kock, 1914.

Sima (Tetraponera) attenuata, Sm. ♀, Buo, 1914.

Sima (Tetraponera) pilosa, Sm. ♂, Padang.

Ischnomyrmex longipes, Sm. ♀ ♂, Serapai, 1915;
Sungai Kumbang, 1915. 1400 metres.

♀ (not described). Length 6 mm.

Ferruginous, scapes, second node, gaster, and borders of mandibles brown.

There is a fairly plentiful yellow-brown pilosity on the body, most abundant on the gaster. Antennæ and legs with long erect hairs. Length of head 2.5 mm., width 2.2 mm., slightly broader in front; the sides from eyes to occiput feebly convex, from the eyes to the base of mandibles they are concave, forming prominent angles. Front somewhat swollen, vertex depressed. Occiput deeply and widely emarginate, as in *Pheidole*. Mandibles massive, the terminal border edentate, the apex with two blunt and stout teeth. Frontal area impressed, indistinctly triangular. Clypeus with a central carina, which broadens posteriorly, the anterior border feebly convex with a slight incision in the centre. Eyes placed just inside the anterior third of sides. Frontal carinae short, divergent. Frontal groove begins at the posterior margin of the eyes and continues to the occiput. The scapes reach as far as the centre of the occipital emargination. All joints of the funiculus longer than broad, the first rather more than twice as long as broad, the remainder increasing in length and insensibly thickening.

Thorax as in the ♂, but pronotum shorter and higher, the mesonotum more raised in front, and the spines longer. Pedicel shorter, the nodes higher, the apex of the first emarginate, with a small tooth at each side; the second as in the ♂, but shorter and broader in proportion, the lateral angles bluntly conulate. Legs long, but less so than in the ♂. Gaster broad and rounded.

Mandibles smooth and shining, with a row of punctures along the terminal border, and scattered points over the rest. Clypeus with lateral striæ. Rest of head longitudinally striate; the striæ, widely separated in front, diverge and become closer together and finer towards the occiput. The striæ extend to the sides of the head, where they are very fine, but disappear beneath. In addition there is a reticulate ground-sculpture most abundant on the sides and vertex. On each side of the frontal groove are a few scattered piligerous tubercles. Pronotum moderately shining, with a few transverse rugæ at the base. Mesonotum with transverse rugæ. There is a fine ground-sculpture on the thorax. Base of epinotum and petiole sub-matt. Postpetiole and

base of gaster matt, densely and finely reticulate, the former in addition with a few elongate punctures. Rest of gaster smooth and shining.

Forel (*Tijdschr. v. Ent.* lviii. p. 289 (1915)), in his description of the ♀ of *longipes*, subsp. *pseudola*, refers to the "type," but I cannot find that any description of the ♀ of *longipes* has been published.

Type, W. C. C. coll.

♀ (undescribed). Length 9 mm.

Dark brown; mandibles, scapes, occiput, and legs red-brown, tarsi paler. Wings yellow-brown, nervures darker.

There is a plentiful yellow-brown pilosity over the whole body, legs, and antennæ. Sparse pubescence on head and parts of thorax.

Mandibles as in ♀. Clypeus shorter and broader, depressed behind the anterior border, the carina less prominent. Head considerably shorter and broader, slightly broader than long, broadest just behind the eyes, which are placed at the anterior third of sides. Vertex swollen. Frontal groove, beginning behind the anterior ocellus, deeper and shorter than in the ♀. Ocelli large. Occipital border widely and shallowly concave. The scapes extend just beyond the occiput.

Thorax massive, nearly as wide as the head. There is a deep transverse sulcus between the scutum and scutellum. Declivity of epinotum equal to the base, both feebly concave. Spines blunt, wide apart, less than half as long as the width between their points.

Sides of petiole from above slightly concave; from the side it rises rapidly for two-thirds of its length to the apex, which forms less than a right angle. The apex is excised. Postpetiole from above much broader than long, with a prominent conule on each side. The sides in front of the conules are feebly convex, behind them concave. Gaster broader than head or thorax.

Sculpture much coarser than in ♀. Head longitudinally rugose, and reticulate-rugose on each side as far as a line continuing the frontal carinæ. Occiput finely reticulate. There is also a fine ground-reticulation over whole head.

Pronotum shining in front, reticulate-striate at sides. The longitudinal line at anterior third of scutum smooth with transverse striæ diverging from it: these curve down the rest of the scutum and become wrinkled striæ. Sulcus with coarse longitudinal ridges. Scutellum irregularly transversely rugose. Epinotum moderately shining with a

few lines. Petiole irregularly rugose and reticulate behind. Postpetiole finely transversely rugose in front and reticulate behind. The entire gaster microscopically reticulate. There are a few indistinct longitudinal lines at the base.

♂ (not described). Length 6.5 mm.

Testaceous-yellow; dorsum of mesonotum darker. Wings yellow-brown, nervures darker. Two cubital cells. Pilosity sparse, yellow. Legs with a few semi-recumbent hairs. Funiculus pubescent, also thorax.

Mandibles spatulate, with a sharp tooth at each angle of the terminal border. Anterior part of clypeus with a transverse depression forming a narrow convex border. In the centre the clypeus has a rounded carina. Head narrowing rapidly behind the eyes, forming a prominence terminated by three large ocelli. Eyes very large, occupying two-thirds of the sides, and prolonged below the articulations of the mandibles. Scape $2\frac{1}{2}$ times as long as the first joint, which is almost globular; the remaining joints are long and thin.

Thorax large and massive. Base of epinotum longer than the declivity, both slightly concave, the angle between them has a blunt tooth on each side. Petiole long and thin; seen from above, slightly broader behind; in profile it forms a moderate convexity with a small angle at each side of the highest point; postpetiole $1\frac{1}{2}$ times as wide as the petiole, widest behind. Gaster long and narrow.

Moderately shining, with a faint ground-reticulation. Scutellum with a stronger reticulation and transverse lines. Metanotum with transverse striæ.

Genitalia.—Rather short, the whole organ not quite $1\frac{1}{2}$ as long as wide, the lamina annularis being $\frac{1}{10}$ of the rest. Stipites not separated into squamulæ; each stipes curves inwards towards the apex, which is truncate. Volsellæ simple, narrow, curved in the form of a boomerang; at the base, whence the curved part originates, there is only a round angle. Sagittæ very broad; the dorsal two-thirds consist of a plate with a broad rounded apex, the margin of which curves round a short distance ventrally, then turns back, forming a deep incision, thence continuing its former direction with a serrated edge. This form gives the sagitta the appearance of consisting of two parts. Penicilli long, the apices broader than the base. Subgenital plate with a point, slightly spatulate at the apex.

Base of subgenital plate, penicilli, tips of stipites, and base of volsellæ pilose. Tips of the latter with sensoria.

Serapai (Kurintji), July 1915 (1229). Types, W. C. C. coll.

Pheidole plagiaria, Sm. ♂, Aur, 1914; Fort de Kock, 1921.

Pheidole havilandi, For. ♂, Gunung Talamau, 1917.

Myrmicaria carinata, Sm. ♂, Gunung Dempu, 1916.
1400 metres. Sibolga, 1913.

Myrmicaria castanea, sp. n.

♂. Length 5.0 mm.

Entirely castaneous. Yellow-brown pilosity very plentiful over whole body, legs, and antennæ.

Head squarer behind the eyes than in *carinata*, distinctly broader behind than in front, occipital border straight. Anterior border of clypeus feebly convex, in centre almost flat; there is a faint ridge down the upper half. Mandibles with four teeth. Antennæ shorter than in *carinata*, extending considerably less than half their length beyond occipital border. Promesonotum as in *carinata*. The raised lateral border of base of epinotum more deeply incised in centre, and the base is considerably longer and narrower, twice as long as wide at the widest point. Spines closer together and straighter, considerably longer than their interval, and horizontal with the base. Pedicel similar to that of *carinata*, but slightly narrower.

Moderately smooth and shining. Mandibles evenly striate. Clypeus, except for the central ridge, smooth. Head smooth except for a few striæ between the frontal carinæ, eyes, and base of mandibles. Scapes hardly, if at all, striate. Promesonotum mostly smooth, with a few irregular striæ, less than in *carinata*; epinotum and sides of thorax smooth. The rest smooth, except for a few wrinkles at the back of the second node.

A single ♂. Gunung Gedeh (No. 129), Jan. 1916. W. C. C. coll.

I am somewhat doubtful in describing this species, but I cannot make it agree with any of the known forms, and Prof. Emery considers it new.

Cardiocondyla wroughtoni, For. ♂, Fort de Kock, 1921.

Crematogaster (Orthocrema) fritzi, Em. ♂-♀, Fort de Kock, 1921.

Crematogaster (Orthocrema) batuvi, For. ♂, Fort de Kock, 1922.

Crematogaster (Orthocrema) longipilosa, For. ♂, Buo, 1914.

Crematogaster (Acrocælia) dohrni, Mayr, subsp. *rogenhoferi*, Mayr, var. *lutea*, Em. ♀, Sumatra.

These ants were found under a shield of carton, beneath which aphids were being tended.

Crematogaster (Acrocælia) dohrni, subsp. *rogenhoferi*, var. *nitida*, nov. Fort de Kock, 1922.

♀. Brown; head and thorax sometimes slightly less dark, but altogether darker than var. *lutea*, which it resembles in its small size (3.5 mm.). First joint of pedicel narrower than in *rogenhoferi*, and the anterior angles less rounded than in *lutea*. The spines more divergent. Sculpture much finer; head moderately shining, the front almost smooth, the rest very finely longitudinally striate; reticulation almost nil. Pronotum somewhat shining, with longitudinal ridges and fine reticulation. Mesonotum entirely smooth and shining (densely reticulate in *rogenhoferi*). Base of epinotum finely longitudinally striate, the declivity smooth and shining, the space between the base of spines entirely smooth and shining. Second node smoother than in the type. Gaster moderately shining, with faint ground-reticulation. Pilosity sparser.

Fort de Kock, Dec. 1922. Type, W. C. C. coll.

Crematogaster (Acrocælia) cornuta, sp. n.

♀. Length 5 mm.

Castaneous-yellow; apical segments of gaster and the entire antenna, except the point of apical joint, brown.

There is a plentiful long yellow pilosity over the whole body; scapes and tibiæ with erect hairs.

Head broader than long, broadest behind the eyes; the sides convex, the occipital border concave, angles rounded.

Mandibles with four teeth. Clypeus depressed along the anterior border, which is feebly concave, almost straight. Eyes placed very slightly behind the middle of sides. The scapes exactly reach the centre of occipital border. Club of funiculus 3-jointed. Second joint of funiculus shorter than the first, slightly longer than broad; joints 3-5 sub-equal, about as long as broad, 6-7 considerably longer and thicker, longer than broad.

Pronotum flat, nearly three times as broad as long without the neck. Mesonotum flat anteriorly, descending to the suture in a gradual curve, the declivity slightly bordered, but without denticles, the suture deep. Base of epinotum as in *spengeli*, but slightly longer and without the median

depressed line; declivity almost vertical, slightly concave. Spines very long, pointed, somewhat more than twice as long as the width between their bases, not unlike, but much longer than, the spines of *spengeli*; the bases very thick. They are almost straight and widely divergent, the distance between their points being more than $3\frac{1}{2}$ times as wide as the distance between their bases, measuring from the inner edge.

Petiole longer than wide, widest just in front of the middle, where the sides form an angle; in front and behind this angle the sides are not convex, but almost straight. Postpetiole with a moderately deep sulcus.

Densely reticulate and sub-matt. Mandibles coarsely striate. Clypeus with longitudinal striæ. Cheeks and antennal sockets with fine curving striation. Rest of head densely and finely reticulate-striate; the striæ are longitudinal, except on the occiput, where they are transverse. Thorax similarly sculptured, but less reticulate and consequently less dull. Base of epinotum and bases of spines longitudinally striate, moderately shining. Declivity smooth and shining, but the striæ continue as far as the space between the bases of the spines. Gaster moderately shining with a superficial reticulation.

Though belonging to a different subgenus, this ant resembles *Cr. spengeli* at first glance. It is characterized by the very long divergent epinotal spines.

♀. Length 8 mm.

Darker than the ♂; teeth of mandibles black, the bases brown; head ferruginous, the sides above the eyes darker; scutum ferruginous, with the anterior central portion and an oblong patch on each side above brown; legs, antennæ, and rest of thorax ferruginous; gaster castaneous, the borders of the segments brown. Wings dusky yellow, nervures brown.

Head, dorsum of thorax, and gaster with a plentiful short pilosity; head and gaster with a scattered pubescence. The pilosity is shorter than in the ♂.

Head short and broad, broader than long, slightly wider behind, sides feebly convex, the occiput concave. Eyes in centre of sides. The scapes do not reach the occipital border.

Spines short and thick, less than half as long as the distance between their bases.

Entire head densely longitudinally striate, the striæ diverging above the eyes towards the lateral angles. Entire

thorax densely striate, the pronotum transversely, the scutum longitudinally, except for the anterior central portion which is smooth and shining; postscutellum and epinotum longitudinally striate. Gaster smooth and shining. Otherwise like the ♀.

♂. Length 3.5 mm.

Dark brown or black; mandibles, antennæ, and legs paler. Wings dusky, iridescent. There is a plentiful short yellow pilosity and a thin pubescence over the body. Legs with short hairs; scapes covered with a very short dense pilosity. Mandibles tridentate, the apical tooth long and pointed, the others small. Mandibles narrow at base, broadening at the centre. Head small, broader than long. Eyes of moderate size, occupying less than two-thirds of the sides, very prominent, placed nearer the anterior border than the posterior, but they do not reach the base of the mandibles. Clypeus convex, the anterior border straight; posteriorly it is very deeply transversely impressed in a line with the antennal insertions. The head narrows rapidly behind the eyes, the occiput being slightly rounded, and there is a small concavity between the posterior ocelli. Antennæ 11-jointed; scape twice as long as broad, first joint broader than long, the second much broader and longer, the longest with the exception of the apical, more than twice as long as broad, the next three subequal, more than half as long as the second, the remainder becoming thinner and longer. The apical is about as long as the second. Thorax very massive, overhanging the head, with a wide transverse impression at the base of the scutum. Spines short and thick, twice as long as broad at base. First node slightly broader in front, the sides feebly convex, the second rounded, broader than long. Gaster small.

Moderately shining; vertex with a few indistinct striæ. Scutum smooth and shining in front, the rest of mesonotum and sides of pronotum finely striate. Scutellum finely reticulate, pedicel slightly roughened, gaster smooth and shining.

Genitalia.—Short and broad, as usual in this genus, broader than long without the annular lamina. Stipes short and blunt, slightly turned inwards at apex. Volsella with a broad base, the apical hooked portion more than one-third as broad as the base, curving down in a blunt rounded point. There is a short lateral rounded process at the side.

Sagitta as broad as long, the teeth long and thick at base,

gradually diminishing in length and thickness to a short distance from the apex where they discontinue. The apex has the appearance of having a semicircular incision, the open space being covered by a membrane. There are a few sensoria on the apex of the volsellæ, and the lower halves of the sagittæ are covered with rows of minute spikes.

Pantjuran Gading (Kurintji), Sept. 1915. Types, W. C. C. coll.

Crematogaster (Paracrema) spengeli, For., subsp. *compacta*,
subsp. n.

♂ major. Length 4.2 mm.

Rather smaller than type. Dull castaneous, head and thorax darker, front and vertex often brown. Apex of gaster and sometimes a patch each side of the first segment a lighter brown. Pilosity scanty; a scattered golden pubescence principally on head, gaster, legs, and antennæ.

Head as in type, broader than long, widest at eyes, the sides convex, occipital angles rounded, occipital border concave. Eyes behind the middle of sides. Clypeus as in type. Mandibles with four teeth. There is a distinct but minute anterior ocellus, the others being only faintly indicated. The scape extends beyond the centre of the occipital border by about its width.

Whole thorax more robust than in the type, the pronotum broader and shorter, the median tubercle of mesonotum not so marked, the declivity more abrupt, a distinct transverse impressed line dividing the two parts of the mesonotum. Base of epinotum broader, the spines stouter, wider apart, and more divergent. Petiole hardly narrower behind than in front, postpetiole broader and shorter.

Sculpture as in type.

♂ minor. Length 3 mm.

Similar to ♂ major, but ocellus absent, and scapes extending more than $\frac{1}{4}$ of their length beyond the occiput.

Suban Ajam, July 1916. Types, W. C. C. Coll. (3).

Crematogaster (Paracrema) spengeli, For., var. *taipingensis*,
For. ♂ ♀ ♂, Kalung.

The ♂ major measures over 6 mm., and the head is 1.6 mm. broad by 1.4 mm. long.

Crematogaster (Physocrema) fulmeki, For., var. ♂, Serapai, 1915.

Apparently a variety of *fulmeki*, but further study is required.

NOTE.—These ants are regular inhabitants of the leaf-stalks of *Nauclea obtusa*, Bl., belonging to the Rubiaceæ.

This plant has naturally thickened leaf-stalks. The ants perforate these thickenings in the young stalks and make a hollow in the interior, which does not in the least harm the plant. Mr. Jacobson has inspected many scores of these plants and never found a single specimen which was not infested by this species of ant. Generally all the older stalks are inhabited. When the stalk is still green and soft, one generally finds only one entrance-hole, giving admission to a small cavity in which a single female is found, often accompanied by eggs or a few larvæ and pupæ. The entrance-hole is often nearly closed again by parenchymous growth of the stalk. Older stalks grow woody and have a brown colour. They are, without exception, perforated in numerous places and hollowed out over their entire length. These old stalks are inhabited by a number of females and numerous workers, and sometimes males. The ants which inhabit the different stalks of the same plant all belong to the same colony.

Monomorium floricola, Jerd. ♂ ♀, Sumatra, 1920.

A whole colony found in the bore-hole of a beetle in a branch.

Monomorium pharaonis, L. ♂ ♀ ♂, Fort de Kock, 1920.

Solenopsis geminata, F., var. *rufa*, Jerd. 4 ♂ ♀ ♂, Fort de Kock, 1920; Padang, 1913, etc.

These ants live in nests excavated in the soil, which is deposited outside their galleries. The paths leading from their nests to their foraging grounds are more or less hollowed out and cleaned from all obstacles such as little grains of sand, straws, and other vegetable matter. Larger objects, such as stones, etc., are undermined by tunnels. These ants bite and sting very fiercely, causing a violent itch.

Pheidologeton affinis, Jerd. 4 ♂ ♀, Fort de Kock, 1914, 1922.

Pheidologeton affinis, Jerd., var. *spinosior*, For. 4 ♂, Fort de Kock, 1922.

Pristomyrmex trachylissa, Sm. ♂, Gunung Dempu, 1400 metres, 1916.

Atopula ceylonica, Em., var. *sumatrensis*, For. ♂, Padang. ♂ (not described). Length 5.5 mm.

Pale ferruginous; mandibles, antennæ, legs, and apical

segments of gaster castaneous. Terminal border of mandibles black. Body with a short blunt pilosity. Antennæ with adpressed hairs.

Head a fraction longer than broad, sides subparallel, slightly concave at their anterior third, where the eyes are situated, and slightly convex at the posterior third, joining rounded posterior angles. Occipital border concave.

Mandibles broad and triangular, with a row of small blunt teeth. Clypeus longitudinally convex. Scapes fail to reach the occipital border by about twice their breadth. Joints 2-8 of funiculus longer than broad. The 3-jointed club has the first joint shortest, the second slightly longer and thicker, and the apical considerably longer. Eyes of moderate size, prominent. Femora swollen. Thorax with an oblique-angled meso-epinotal emargination. Pronotum with very small, sharp, anterior angles. Dorsum of thorax constricted between the pronotum and mesonotum.

Base of epinotum $1\frac{1}{2}$ as long as broad, rectangular, in profile almost flat. Base $\frac{3}{4}$ as long, feebly concave. Spines blunt, hardly thinner at apex than at base, slightly directed outwards and upwards, shorter than the distance between their points.

Stalk of petiole nearly as long as the node, the latter from above, oval, slightly broader behind; from the side it is higher behind, subtruncate in front, rounded behind. Post-petiole broader than long, slightly broader behind, sides convex, broader than first node; from the side, convex above, and with a very convex projection beneath. Gaster oval. Subopaque; mandibles smooth with small scattered punctures. Upper surface of head longitudinally and coarsely rugose, the clypeus and front merely striate. Thorax longitudinally rugose, the rugæ becoming more reticulate posteriorly. Pedicel reticulate-rugose. Base of gaster longitudinally striate, the rest smooth and shining. Legs smooth and shining.

1 ♂, Padang, west coast (No. 15), Sept. 1913. W. C. C. coll.

Meranoplus mucronatus, Sm. ♂, Aur, 1914; Padang, 1913.

Meranoplus castaneus, Sm. ♂, Buo, Mar. 1914.

Tetramorium pacificum, Mayr. ♂, Fort de Kock, 1922.

Found in a deserted bore-hole in a decayed branch. Gunung Dempu, 1916.

Cataulacus horridus, Sm., ♂ ♀.

♀ (not described). Deälated.

Length 6·5–7·0 mm.

Colour as in ♂ ; wing-insertions ferruginous. Pilosity more plentiful.

Eyes no larger proportionately. The anterior ocellus alone present. Spines of epinotum broader at base, shorter, less dilated (subparallel). Sculpture of head similar, but more reticulate. Scutum of mesonotum longitudinally striate. Rest of thorax sculptured as in ♂.

The broad bases of the spines are longitudinally striate. Base of gaster more deeply striate; otherwise, except for sexual differences, similar to the ♂.

1 ♀, Sibolga, July 1913 (No. 57). W. C. C. coll.

Proatta butteli, For. ♂ ♀ ♂, Fort de Kock, 1921 (No. 1186).

Found in a decayed bamboo in the earth in company with many myrmecophilous Gryllidæ.

♀ (not described). Length 4·5 mm. (♂ 2·3).

Dark reddish brown; mandibles, clypeus, frontal carinæ, anterior of mesonotum, wing-insertions, apical segments of gaster, legs, and antennæ ferruginous. Wings fuscous. Pilosity almost nil.

Head with mandibles in the form of an almost equilateral triangle, much broader behind and narrower in front than in the ♂. Broader than long without mandibles. Occipital border concave. Mandibles narrow, with three acute teeth at apex followed after a space by a broad blunt tooth near the base. Frontal carinæ shorter and wider apart, and the teeth on the occiput blunter. The scape just passes the occiput. Eyes prominent, placed below the middle of the sides. On the vertex is a prominence rising into two short longitudinal ridges, concave between; the anterior ocellus is placed in front of this prominence, and the posterior ocelli at each side of the lateral ridges. Thorax massive, the scutum roughly forming a square when looked at from above; laterally the pronotum has a pair of blunt spines, one above the other.

Anteriorly the mesonotum has a short longitudinal impressed line and two wide ridges, which converge near the centre. Scutellum prominent; it is slightly concave from side to side, with a central ridge.

Metanotum with a central blunt spine (Forel, in his description of the ♂, speaks of this spine as belonging to the epinotum). Epinotal spines short, broad at base and

acute at apex, curving slightly inwards. In profile the declivity equals the base, both concave. Pedicel as in the ♂, but broader and shorter. Gaster large and oval, the basal border feebly sinuate. The basal segment covers nearly the whole gaster.

Head longitudinally and densely reticulate-rugose; pronotum transversely so; rest of thorax similar to the head. Bases of epinotal spines striate. Pedicel transversely rugose. Base of gaster longitudinally reticulate-striate, rest of basal segment closely striate. In addition, the whole body has a microscopic ground-reticulation.

2 ♀ ♀ (one immature). Fort de Kock, March 1921 (No. 1186). Type, W. C. C. coll.

The genus was described by Forel (Rev. Suisse de Zool. xx. 15, p. 768, 1912) from ♂ ♂ and ♂ ♂ found with other ants in a termites' nest in Sumatra. There was no trace of fungus gardens in the nest, though Forel conjectures that the genus may have habits similar to the Attini of the new world.

Subfamily *DOLICHODERINÆ*, For.

Dolichoderus (*Hypoclinea*) *tuberifer*, Em. ♂, Sungai Kumbang, 1400 metres, Aug. 1915.

Dolichoderus (*Hypoclinea*) *bituberculatus*, Mayr. ♀ ♀, Fort de Kock, July 1922, etc.

Dolichoderus (*Hypoclinea*) *taprobanae*, Sm. ♂, Buo, 1914.

Dolichoderus (*Hypoclinea*) *carbonarius*, Em., var. *latisquama*, Em. ♀ ♀, near Pajokumbah, West Coast Sumatra, 1923.

The small carton nests built by this ant were found in thousands on the branches of several adjoining trees of different kinds. From a distance it looked as if the branches were covered with galls. All the nests on each tree apparently belonged to one colony.

Originally every nest had only from one to three openings, the other holes being made afterwards when the ants were kept in confinement in the tin. The original entrances have slightly raised borders. In the nests a certain kind of coccid was bred by the ants on the branches. Some of the nests contained from one to four fertile females. No males were found. All contained eggs, larvæ, and pupæ, besides an amount of finely divided vegetable matter, apparently the building material for the carton.

[The largest of these nests measures $2\frac{1}{4} \times 1\frac{1}{2}$ inches, and is roughly oval. Others are longer and narrower, $\frac{3}{4} \times 2$ inches, the smallest being circular, less than $\frac{1}{2}$ inch in diameter. In colour they are dark grey-brown.—W. C. C.]

Tapinoma andamense, For., var. *cupsincola*, For. ♂ ♀, Fort de Kock, Nov. 1913.

Tapinoma melanocephalum. ♂ ♀, Fort de Kock, Oct. 1920.
Found in a decayed branch in a deserted bore-hole.

Technomyrmex grandis, Em. ♂, Fort de Kock, 1913.

Subfamily *FORMICINÆ*, Lep.

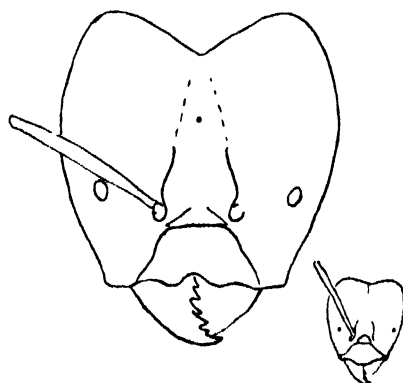
Pseudolasius jacobsoni, sp. n. (Fig. 4.)

♂. Length 7 mm.

Castaneous - yellow; mandibles dark brown, and the clypeus and a triangular patch enclosing the ocelli dark castaneous. Apical segments of gaster shaded with darker colour, the borders of the segments testaceous.

Body, including scapes and legs, with a fairly abundant

Fig. 4.



Head of soldier and worker minima of *Pseudolasius jacobsoni*
on same scale.

erect yellow pilosity; on the head it is confined to the clypeus, ocellar region, and occipital border. Epinotum nearly bare. There is a very fine pubescence on head, thorax, legs, and antennæ.

Length of head (excluding mandibles) 2.6 mm.; width 2.4 (nearly).

Mandibles broad at base, the external border very convex, armed with five strong blunt teeth. Clypeus deeply emarginate in front, and raised in the centre behind the emargination. Head broadest just behind the eyes, which are small, flat, and placed at the anterior third of sides and somewhat nearer to the sides than to the frontal carinæ. Occipital border with a wide and deep triangular emargination. Frontal area broad and triangular, indistinct. Frontal carinæ slightly narrower behind. Anterior ocellus distinct, the posterior pair indicated by small pits; the whole situated in a shallow depression, from the back of which a distinct groove runs to the occiput. Anterior half of scapes flattened and slightly curved; the joints of funiculus decrease very slightly in length to the apical, which is not quite twice as long as the two preceding ones. The scapes reach to about their width from the centre of the emargination of occiput.

Pronotum wider than long, widest behind the middle; from this point, where it forms an angle, the sides converge in almost straight lines to the neck, and posteriorly in a similar way to the posterior border, which is twice as wide as the neck. Thorax constricted at meso-epinotal suture, where it is emarginate. Base of epinotum short, the declivity regularly convex. There is a slight longitudinal impression in the centre of the segment. Scale from above broad and flat, in profile cuneiform. Gaster much smaller than the head, and slightly wider than the pronotum.

Whole body moderately shining. Mandibles smooth and shining, with one or two small punctures and a few striæ at the base. Clypeus and frontal area smooth and shining; the rest of head covered with a fine ground-reticulation, most dense anteriorly. Thorax and gaster almost entirely smooth and shining.

♂ media. Length 4.0 mm.

Colour as in ♀, but mandibles dark castaneous, and the clypeus hardly darker than the rest of the head, and the patch on the vertex is paler than in the ♀. Pilosity rather more abundant.

Head measures 1.23×1.17 mm., the sides are less convex and the emargination of the occiput less deep, and the whole upper surface of the head is flatter. Mandibles triangular, the outer border straighter and the masticatory border broader than in the ♀, with 8-9 sharp teeth. The clypeus is less deeply emarginate and without the prominent raised portion. Eyes similarly placed; no ocelli, merely faint indications less noticeable than in the ♀. The scapes

are much longer, reaching to one-quarter of their length beyond the centre of the occiput. Thorax somewhat longer and narrower and epinotum more rounded in profile.

Mandibles opaque, finely longitudinally striate, with a few small points.

♂ minor. Length 2·8 mm.; head $·78 \times ·76$ mm. Differs as follows from the ♂ media :—Mandibles with eight smaller teeth; clypeus barely emarginate; scapes slightly longer; epinotum flatter. Otherwise similar.

♂ minima. Length 2 mm. Similar to ♂ minor, except for size.

Sibolga, Aug. 1913. No. 1250. The ♂ ♂ vary slightly in colour, some being darker. Types, W. C. C. coll.

Prenolepis jacobsoni, Crawley (Ent. Rec. xxv. 2, p. 30, 1923).

♂. Length 26 mm.

Yellow-testaceous, head somewhat darker, the gaster dark castaneous, lighter in some specimens.

Mandibles with six teeth. Head small, oval, as long as broad, broadest at eyes which are large and prominent and situated barely behind the middle of sides; the head narrows rapidly behind the eyes, the occipital border straight. Clypeus carinate, the anterior border feebly sinuate, the posterior border marked out with a black line. Frontal area deep. Scapes long, extending more than half their length beyond the occipital border.

Thorax strangulate and emarginate at mesonotum, the pronotum and mesonotum forming a curve with an obtuse angle at the suture, and the epinotum forming a rounded convexity. Scale thick, very inclined, straight and sharp-edged at top, the stalk long and thick, the whole pedicel fitting into a recess in the basal segment of gaster. This latter is concavely truncate at its anterior border.

Head and gaster provided with plentiful long yellow-brown hairs; pronotum has one pair of short followed by two pairs of long hairs; the mesonotum has one or two pairs of short hairs. The legs and antennæ covered with plentiful long semi-adjacent pilosity. There are a few short adpressed hairs on the cheeks. Entirely smooth and shining.

Fort de Kock, Sumatra. Type, W.C.C. coll.

Recalls *Pr. naoroji*, Forel, from Assam and N.W. India, but thorax not so pilose, the epinotal convexity only a little more than half the pronotal convexity (in *naoroji* not much shorter than the pronotal). The scale, truncation of gaster, and length of scapes apparently similar.

Nest found under a fallen tree. This ant builds in the ground.

Camponotus (Myrmoturba) maxwellensis, For. ♀, Serapai, 1915.

Camponotus (Myrmoturba) tinctus, Sm., var. *carinifer*, Vieh. ♀, Muara Sako, 1915; Aur, 1914.

Camponotus (Dinomyrmex) gigas, Ltr. ♀, Batang Palupuh, Sibolga, etc.

The nest was in the forest under the roots of a tree, and could not be reached.

Camponotus (Dinomyrmex) dorycus, Sm., subsp. *carin*, Em., var. *labiensis*, For. ♀, Gunung Dempu, 1400 metres; Aur, 1916.

Camponotus (Myrmosphinctus) camellinus, Sm. ♀, Fort de Kock, 1913; Kaluna, 1913.

Camponotus (Myrmamblys) reticulatus, Rog., subsp. *sericellus*, Vieh., var. *rugosior*, Craw. ♀ ♂ ♀ (Ent. Rec. xxxv. 2, p. 30, 1923), Fort de Kock, 1921.

♀ major. Length 5 mm.

Slightly smaller than *sericellus*, the sculpture of head coarser, and pubescence on gaster less abundant. Mandibles with six teeth. The light colour of head extends as far as the eyes and over a great part of the space between the frontal carinæ. Frontal area dark. Bands on the borders of the segments of gaster almost white. Otherwise corresponds to Viehmeyer's description of *sericellus* from Singapore.

♀ minor. Length 3.5 mm.

Slightly smaller, otherwise corresponds to the subsp. description.

♀. Length 5.5 mm.

The light colour of head more sharply defined than in ♀ major, and does not extend beyond the articulations of the antennæ nor between the frontal carinæ. Wings hyaline. Wing-insertions yellow-white. Head smaller and narrower in front, and mandibles less massive than in ♀ major. The angle between base and declivity of epinotum rounded. Otherwise like ♀ major except for sexual differences.

♂. Length 4 mm.

Dark brown, gaster darker, almost black; mandibles,

extremities of cheeks, and articulations of antennæ paler; insertions of wings and the two hind coxæ yellow-white. Borders of segments of gaster not paler than rest. Gaster abundantly pilose.

The scapes extend more than one-third of their length beyond the occiput. Mandibles edentate. Clypeus feebly convex, the anterior border straight. Eyes occupy more than half the sides of head, which narrows behind. Node low and thick.

Whole head feebly reticulate; the thorax more faintly so, and shining; gaster densely and finely transversely reticulate.

Sumatra, Fort de Kock, 1921. 920 metres (*Jacobson*, 1175).

Kindly compared with a co-type by Prof. Emery.

Camponotus (Colobopsis) badius, Sm. ♂, Buo, 1914.

Camponotus (Colobopsis) saundersi, Em. ♂, Buo, 1914.

Echinopla melanarctos, Sm. ♂, Aur, 1914; Balun, 1914.

Polyrhachis bihamata, Drury. ♂, Padang, Aur, etc., 1914.

Polyrhachis bellicosa, Sm. ♂, Buo, 1914; Padang, 1913, etc.

Polyrhachis ypsilon, Em. ♂, Muara Kiawei, 1915.

Polyrhachis (Myrmhopla) defensus, Sm. ♂ ♀, Fort de Kock; Aur; Sibolga, etc.

Polyrhachis (Myrmhopla) acantha, Sm., var. *diaphantus*, Sm. ♂, Aur, 1914.

Polyrhachis (Myrmhopla) abdominalis, Sm. ♂, Padang.

Polyrhachis (Myrmhopla) moeschi, For. ♂ type, Fort de Kock, 1921 (*Crawley*, Ent. Rec. xxxv. 2, p. 31, 1923).

♂. Length 5 mm.

Legs black, insertions of antennæ and borders of mandibles brown. A few hairs on mandibles and anterior border of clypeus, and apex of gaster; a row of bristles under first joint of tarsi; a fine scattered pubescence on femora, tibiae, and gaster; otherwise glabrous. Mandibles with five teeth. Clypeus strongly arched, not carinate, the lateral anterior border convex with a central projecting portion, occupying rather more than one-third of the whole anterior border, with a crenate edge ending in a tooth at each side. Frontal area broadly triangular, indistinct. Frontal carinae sinuate,

equally wide in front of and behind articulation of antennæ. Head as long as broad, widest at eyes, which are prominent and placed at the posterior angles; occipital border convex. Antennæ very long, reaching to base of gaster.

The scape extends almost two-thirds of its length beyond the occiput. All funicular joints long and narrow, the second shorter than the first or third. Pronotum with rounded shoulders. Promesonotum convex in both directions, the mesonotum bluntly bordered. Thorax constricted and slightly impressed at mesoepinotal suture. Base of epinotum nearly twice as wide as long, barely half as long as declivity, with two long horizontal spines slightly directed outwards, thick at base, almost as long as the declivity. Legs long.

Node from the side more or less conical, from in front slightly wider at apex, sides straight; the two fine spines are horizontal, more widely spreading proportionately than the epinotal spines, nearly as long as the space between their bases.

Shining; mandibles with scattered punctures and finely striate at base. Rest of body with a fine ground-reticulation, which on the promesonotum has a circular direction, and on scale and gaster is more or less transverse.

Polyrhachis (Myrmhopla) striata, Mayr. ♂, Port de Kock.

Polyrhachis (Myrma) mayri, Rog. ♂, Muara Kiawei.

Polyrhachis (Myrmothrinax) thrinax, Rog., subsp. *javanica*, Mayr, var. (Crawley, Ent. Rec. xxxv. 2, p. 81, 1923).
Fort de Kock, 1920.

The var. *javanica*, according to the description, has legs and antennæ ferruginous, but two specimens from Sumatra have the antennæ (except the last three or four joints of funiculus) and entire legs dark brown or black. Emery tells me he has a specimen from Singapore with similar colouring. As there does not appear to be any other difference in these specimens from the type, I prefer to record them as subsp. *javanica*, Mayr, simply.

Fort de Kock, Sumatra (*E. Jacobsen*, 1097, 1920).

Forel ('Formicides des Indes et de Ceylan,' part 111) refers to "race *javana*, Mayr," and is followed by Bingham ('Fauna of British India,' vol. ii., Formicidæ, p. 411). The name given by Mayr to his variety in Tijds. voor Entom. x. 1867, p. 20, is *javanica*.

These ants make their nests of cardboard-like matter (not

woven) between two or more adjoining leaves. The ants, when disturbed, quiver their bodies up and down.

Polyrhachis (Cyrtomyrma) rastellata, Ltr. ♂ ♀ ♂, Sangai Kimbang, 1600 metres, etc.

Polyrhachis rastellata, var. *javana*, Vieh.

♀. Length 6 mm.

A single ♀ appears to be this variety, as the legs are red and the tarsi black, as given by Viehmeyer as the colour of his var. *javana* (♂). He gives no description of the ♀.

Fort de Kock, Sumatra (*Jacobson*, 1177).

XLVIII.—*Exotic Muscaridæ (Diptera)*.—XII.* By J. R. MALLOCH, Bureau of Biological Survey, Washington, D.C.

Subfamily ACTINÆ.

Actia suspecta, sp. n.

Female.—Head tawny, upper part of occiput fuscous and grey-pruinulent; frontal orbits grey, densely grey-pruinulent; interfrontalia reddish; antennæ tawny, third segment brownish in front (above); palpi tawny; face grey-pruinulent. Thorax black, densely grey-pruinulent, not vittate. Abdomen shining, grey-pruinulent at bases of tergites, each tergite with a narrow testaceous apical margin. Legs pitchy, fore coxæ and tibiæ paler, yellowish. Wings hyaline. Calyptreæ white. Halteres yellow.

Frons at vertex fully one-third of head-width, widened anteriorly; ocellar bristles long; upper inner orbitals backwardly directed, long, outer series with two long bristles forwardly directed; antennæ extending almost to mouth-margin, third segment broad, about 2.5 as long as wide; arista subequal in length to third antennal segment, second segment nearly one-third as long as third, the latter thickened on basal half; proboscis short and stout; palpi normal. Dorsum of thorax so much injured that it is not possible to define the chætotaxy; posterior sternopleural bristle long, lower one almost midway between it and anterior bristle.

* For Part XI., see *Ann. & Mag. Nat. Hist.* (9) xii., October 1923, pp. 505-528.

Abdomen with a strong pair of bristles in middle of apex of second visible tergite, and strong apical bristles on tergites 3 and 4. Fore femur with the postero-ventral bristles very weak except at apex; fore tibia with a posterior median bristle and a series of four antero-dorsal setulæ; mid-femur with two long bristles on anterior surface—one low-placed before middle, the other higher and at middle; mid-tibia with one strong antero-dorsal and a shorter antero-ventral bristle, and two or three posterior setulæ; hind femur with three antero-ventral bristles—two basad of middle, and one, stronger, near apex; hind tibia with four short postero-dorsal setulæ, about four antero-dorsal setulæ, the apical one longest, and one or two antero-ventral setulæ. First posterior cell ending very little in front of wing-tip; first vein setulose on apical third of upper surface, third vein setulose on basal half above and below; inner cross-vein about three-fifths from base of discal cell and before apex of first vein; outer cross-vein about its own length from inner; section of fourth vein proximad of outer cross-vein not over one-fourth as long as distance from that vein to bend of fourth vein; penultimate section of fifth vein about four-fifths as long as ultimate section.

Length 2.5 mm.

Type, Pusa, Bengal, 19. ii. 1912 (*Chandra Sikhara Misra*).

The specimen is labelled "boring in wheat," but bears an additional label, "occurrence of one fly in wheat should be confirmed," and on the other side "probably scavenger in habits." I believe the species, which belongs to the Tachinidæ, will prove to be a primary parasite on a species of *Atherigona*, probably *nudiseta*, Malloch.

Genus *ATHERIGONA*, Rondani.

In Part IX. of this series of papers I described a number of species of this genus without giving a key to them. I believe that I have now succeeded in making a satisfactory key to the genus, and present in this part a table of those species of the genus which possess the following characters:—

Fore femur with a slight but distinct rounded emargination or concavity above near apex, beyond which the dorsal surface is usually more or less densely haired, or, if there is no such concavity present (the character being one confined to males), there is no outstanding bristle on the postero-ventral surface near apex. Male abdomen short and stout, the hypopygium without a trifoliate process situated upon a long hair-like stalk as in typical *Atherigona*.

This is the group for which Grimshaw erected the genus *Acritochæta*, but there is no character by means of which many of the females can be separated from typical *Atherigona*, so far as I can detect—a fact which invalidates the generic claim of the segregate.

Partial Key to Atherigona.

- | | |
|---|----|
| 1. Males..... | 2. |
| Females..... | 6. |
| 2. Fore femur without a distinct concavity above near apex | 3. |
| Fore femur with a distinct concavity above near apex, and with more or less dense short hairs on dorsum beyond the concavity | 9. |
| 3. Fore and mid tarsi each with fine erect hairs on anterior and posterior surfaces of basal two segments, most noticeable on mid-pair; hind femur with a short comb-like series of minute black bristles at base on postero-ventral surface; hind trochanters with short black setulæ; fore femora and tibiæ blackened at apices. Fore and mid tarsi normal, without fine erect hairs as above; hind trochanters without black setulæ | 4. |
| 4. Hind femur swollen basally, with a slight tubercle near base on postero-ventral surface, which is surmounted by a closely-placed series of short black setulæ that are directed slightly towards base of femur; fifth abdominal sternite with two narrow processes which are pointed at tips, fringed below with short black setulæ, and have each one short stout apical bristle | 4. |
| Hind femur without exceptional armature, the postero-ventral surface bare or almost so | 5. |
| 5. Third abdominal tergite (second visible) with a dense tuft of long black flexuous bristles on each anterior lateral angle, the tergite usually overlapping venter so far that the tufts appear to be situated on venter; fifth tergite with a long pale bristle on each side of disc, which extends forward along venter almost to base of abdomen; legs partly fuscous; discal cell of wing rounded at outer lower angle, the fifth vein not continued beyond apex of discal cell | 5. |
| Third tergite very broad, meeting or almost meeting on venter, but without long bristles as above; fifth tergite with only | |

setifemur, Malloch.

tuberculata, Malloch.

aberrans, Malloch.

- a few short black bristles; legs entirely stramineous; discal cell normal, fifth vein continued to margin of wing beyond apex of discal cell *pallidipes*, Malloch.
6. Legs entirely testaceous yellow; lower sternopleural bristle present but weak, in usual position *pallidipes*, Malloch.
- At least the fore femora and tibiæ blackened apically; tarsi black; lower sternopleural bristle absent 7.
7. Sternopleura almost or entirely bare in centre; third antennal segment fuscous.. 8.
- Sternopleura with some black setulæ in centre, two or three of which are quite prominent and curved backward and downward; antennæ and palpi brownish yellow *distincta*, Malloch.
8. Inner cross-vein not beyond middle of discal cell; bases of hind femora on their postero-ventral surfaces with minute stubby setulæ in a short series *setifemur*, Malloch.
- Inner cross-vein very distinctly beyond middle of discal cell; hind femora without stubby bristles, but with short fine hairs on postero-ventral surface basally *aberrans*, Malloch.
9. Third and fourth wing-veins decidedly divergent apically; second abdominal sternite very large, covering sides of tergites and at least half of venter; thorax yellow; palpi entirely yellow, dilated apically and very long; fore tarsi with long sparse hairs along sides; legs entirely yellow *longipalpis*, Malloch.
- Third and fourth wing-veins more or less appreciably convergent apically; second abdominal sternite not as above, not noticeably enlarged, covering much less than half of venter 10.
10. First posterior cell of wings very much narrowed apically, the tip of wing with a fuscous spot, section of costal vein between apices of veins 3 and 4 not over half as long as outer cross-vein; fore tarsi with some fine outstanding hairs on sides which are longer than the diameter of tarsus; thorax with three dark brown vittæ; abdomen with three pairs of blackish spots on dorsum *maculipennis*, Stein.
- First posterior cell of wing but slightly narrowed at apex, without a sharply defined fuscous apical spot, the section of costa between apices of veins 3 and 4 much more than half as long as outer cross-vein. 11.
11. Fore tarsi with some fine outstanding black hairs along the sides which are not longer than the tibial diameter; palpi pale

- yellow, elongate, very slightly dilated apically, the dilated part with soft pale hairs much as in *longipalpis*..... *pallidipalpis*, Malloch.
- Fore tarsi without fine outstanding hairs along sides; palpi not as above, not noticeably dilated apically, generally brownish or partly fuscous, and without soft pale hairs at apices 12.
12. Abdomen with a pair of blackish spots on second and third visible tergites, third tergite about one-fourth as long as second; interfrontalia deep black; apices of fore tibiæ and fore tarsi entirely black, the latter long and slender, basal segment about two-thirds as long as tibia *crassisetæ*, Stein.
- Abdomen with a pair of blackish spots on each tergite from second to fourth inclusive, the third tergite about as long as second (*excisa*), or about half as long as it (*hendersoni*); fore tarsi not so long and slender, basal segment less than two-thirds as long as tibia 13.
13. Wings with a brownish cloud at apices; hairs and bristles on sides of third and fourth tergites yellow; thoracic dorsum with three conspicuous dark brown vittæ; margins of scutellum yellowish, disc dark brown; legs yellow..... *hendersoni*, Malloch.
- Wings clear; bristles and hairs on abdomen black; dorsum of thorax not noticeably vittate; scutellum usually grey, yellowish on margin; apices of fore femora and of fore tibiæ and the fore and hind tarsi usually fuscous, the latter paler apically. *excisa*, Thomson.

In a subsequent part of this series I intend to present a key for the identification of all the species of the other group known to me. This second key will include the females of some of the species in the above key, as some of them have a distinct bristle near the apex on the postero-ventral surface of the fore femur and no concavity on the dorsal surface, thus falling within the characterization of the second group.

Subfamily *EGENIINÆ*.

In Part II. of this series of papers I described a new genus and species under the name *Xenotachina pallida*. In that paper I referred the genus to the family Tachiinidæ, although I pointed out that there are several characters possessed by the genus which appear to associate it closely with Muscaridæ. At the time I wrote the description I had before me no closely related forms, but subsequently Dr. J. M. Aldrich showed

me a specimen of *Egenia cylindrica*, Robineau-Desvoidy, sent to him by the late Dr. K. Kertész, and now I have some specimens of this species in my own collection.

This single genus *Egenia* comprised the subfamily Egeniinae. It occurs in Europe, and now I can add to the subfamily *Xenotachina* from the Indian region. I have identified specimens of *X. pallida*, Malloch, in the United States National Museum collection from Java.

The two genera are very closely allied, being separable as follows:—

Prosternum hairy; costal vein of wing rather abruptly discontinued just beyond apex of third vein; anterior intra-alar and ocellar bristles long and strong	<i>Egenia</i> , Robineau-Desvoidy.
Prosternum bare; costal vein continued to apex of fourth vein, though narrowly so; anterior intra-alar and ocellar bristles microscopic or absent	<i>Xenotachina</i> , Malloch.

I am inclined to remove the subfamily from Tachinidæ because of the lack of a well-developed postscutellum and of a basal bristle on the ventral surface of the hind metatarsi. Other characters in which it differs from the normal Tachinid are:—Sternopleura with three bristles in an almost equilateral triangle; fourth wing-vein running straight to wing-margin, not bent forward on apical half or more; sixth wing-vein extending to margin of wing, though rather indistinct on apical portion; only two or three short setulose hairs on hypopleura, which are not in a vertical series below the spiracle; basal abdominal sternite bare; arista plumose.

The subfamily may be removed to the Muscaridæ, where it will retain its rank, agreeing as it does with no other subfamily as yet defined in that group.

Subfamily PHAONINÆ.

Genus NEOHELINA, nov.

Generic Characters.—Similar to *Helina*, R.-D., bearing a resemblance to the slender species of that genus. The costal vein, however, is discontinued a little beyond the apex of third vein, the remainder of the cell between that vein and fourth having no more distinct marginal vein than does the second posterior cell. Thoracic chaetotaxy as in *Helina*, but there is a short setula on each side of the prosternum, and the prealar bristle is absent.

Genotype, the following species.

Neohelina semivittata, sp. n.

Male.—Head brown, with distinct greyish pruinescence, upper occiput fuscous; antennæ and palpi orange. Thorax brownish fuscous, densely greyish pruinulent, opaque, dorsum with two narrow submedian dark brown vittæ which do not extend to posterior margin, and laterad of these two or four less distinct interrupted vittæ of the same colour. Abdomen honey-coloured, greyish pruinulent, each tergite with an elongate fuscous mark in centre which does not reach hind margin. Legs, including coxæ, honey-yellow, tarsi fuscous. Wings yellowish, veins brown, both cross-veins narrowly clouded. Calyptræ whitish yellow. Halteres brownish yellow.

Eyes nude; frons one-fifth of the head-width; orbits narrow, distinct, each with about seven bristles which are incurved; face slightly concave; parafacial narrower than third antennal segment; cheek nearly one-third of the eye-height; a number of bristles at and above bases of vibrissæ; third antennal segment about 1.5 as long as second; arista with its longest hairs nearly as long as width of third antennal segment. Thorax with 2+3 dorso-centrals; two strong intra-alars; and sternopleurals 1:2. Abdomen sub-cylindrical, with rather long apical and lateral bristles on tergites; hypopygium concealed. Fore tibia with a short median antero-dorsal bristle; mid-femur with fine antero-ventral setulæ and longer setulose postero-ventral hairs; mid-tibia with one antero-dorsal and two or three postero-dorsal bristles; hind femur with an almost complete series of strong antero-ventral bristles, and numerous long setulose hairs on basal half or more of postero-ventral surface; hind tibia with one or two antero-ventral, two antero-dorsal, and two postero-dorsal bristles. Veins 3 and 4 divergent apically; outer cross-vein at a little less than its own length from inner and at a little over that length from end of fifth vein; penultimate section of fourth vein about one-fourth as long as ultimate section; sixth vein ceasing rather abruptly at one-fourth from margin. Lower calyptra much protruded.

Length 6 mm.

Type and one paratype, Loowanna, E. Dorrig, N.S.W., Australia, 29. i. 1923. Received from Dr. E. W. Ferguson, Department of Public Health, Sydney.

This species has a rather evident resemblance to *Egenia cylindrica*, R.-D., but the sixth vein is incomplete and there are no setulose hairs on the hypopleura.

Subfamily *FANNINÆ*.Genus *FANNIA*, R.-D.

There is no printed key to the North American species of the genus *Fannia* available to students of this family, and, as so many of the species occurring in the Nearctic Region occur also in the Palearctic, I consider it worth while to publish the following synopsis, which I have used for some years in identifying the species.

It is not improbable that some of the Nearctic species occur in other faunal regions, and by publishing this key I hope to make it possible for students to recognize any such species they may find. The eighteen European species are marked thus, * :—

Key to Species (Males).

1. Mid-coxæ with at least one stout thorn on anterior side, the apex of which is usually rectangularly bent. 2.
Mid-coxæ with bristles of usual structure and strength 5.
2. Mid-tibia with a tubercle on ventral surface about one-third from apex **scalaris*, Fabricius. 3.
Mid-tibia more or less gradually thickened on apical half, but without a tubercle 3.
3. Fore tibia with a prominent tuft of bristles or setulose hairs at apex on posterior side. **manicata*, Meigen. 4.
Fore tibia without such a tuft 4.
4. Abdomen pellucid yellow at base; eyes separated by less than width across posterior ocelli; hind femur with short stout bristles on apical two-thirds of antero-ventral surface, the apical three or four elongated, but their length barely greater than the diameter of femur. *pellucida*, Stein.
Abdomen black; eyes separated by a greater distance than width across posterior ocelli; hind femur with fine hair-like bristles on apical two-thirds of antero-ventral surface, the apical five or six distinctly longer than the diameter of femur **fuscula*, Fallén.
5. Eyes at narrowest part of frons separated by more than twice the width across posterior ocelli; width of frons at vertex one-fourth of the head-width; small species, 3 mm. in length; hind femur armed on the basal three-fourths of postero-ventral surface with rather widely spaced hair-like bristles; hypopygium small *latifrons*, Malloch.

- Eyes separated by less than twice the width across posterior ocelli; species in other respects not as above 6.
6. Hypopygium very large, projecting knob-like ventrally; eyes separated by nearly twice the width across posterior ocelli; legs entirely black; hind coxæ bare above at apex; fifth abdominal sternite tapered to a point **glauescens*, Zetterstedt.
- Hypopygium small or moderate in size; fifth sternite not pointed 7.
7. Mid-metatarsus with a comb-like fasciculus of minute setulæ at base on ventral surface, or with a short outstanding spine at this place 8.
- Mid-metatarsus without such a fasciculus or spine 12.
8. Antero-ventral and postero-ventral surfaces of hind tibiæ with long hairs **armata*, Meigen.
- Hind tibiæ without long hairs as above, with the usual bristles 9.
9. Eyes hairy on upper half; basal segment of mid-tarsus with an acutely pointed spine; hind femur curved, with a series of closely placed bristles from base to apex on antero-ventral surface; hind tibia with three or four long bristles on apical half of antero-ventral surface; fifth abdominal sternite with a V-shaped cleft which extends almost to base; hind coxæ bare above at apex *lasiops*, Malloch.
- Eyes bare; species not as above in other respects 10.
10. Squamæ and halteres pale; fasciculus on mid-metatarsus poorly developed; bases of all tibiæ conspicuously yellowish *flavibasis*, Stein.
- Squamæ and halteres fuscous, sometimes the latter paler; bases of fore tibiæ only pale 11.
11. Fasciculus on mid-metatarsus much higher than long, almost like a stout thorn; squamæ and halteres black **area*, Meigen.
- Fasciculus on mid-metatarsus much longer than high; squamæ and halteres fuscous, the latter sometimes yellowish *æthiops*, Malloch.
12. At least the hind tibiæ translucent yellowish; abdomen with or without a median dark stripe, never with three series of dark spots 13.
- At most the bases of the tibiæ yellowish, or, if the legs are more extensively yellowish, the abdomen has three series of dark spots on dorsum 18.
13. Abdomen black; femora black except at apices; eyes rather widely separated;

- hind tibia with two antero-dorsal and two antero-ventral bristles *tibialis*, Malloch.
- Abdomen in large part, or entirely, pellucid yellow; femora often entirely yellow, the hind pair always so, sometimes the apices of hind pair darker 14.
14. Hind femur very much curved, swollen below near apex, the swollen part furnished with a dense clump of long black bristly hairs or setulæ which are directed downward and have their apices curled. *curvipes*, sp. n.
- Hind femur not noticeably curved and not armed as above 15.
15. Scutellum largely yellowish; hind tibia without long hair-like bristles, only the usual bristles present **pretiosa*, Meigen.
- Scutellum black. 16.
16. Hind tibia with long hair-like bristles on antero-ventral and postero-ventral surfaces apically 17.
- Hind tibia with about three antero-ventral bristles, the apical one not close to apex of tibia, the postero-ventral surface bare *pallidiventris*, sp. n.
17. Basal segment of hind tarsus with a fringe of long hairs on posterior surface; hair-like bristles on apical portion of hind tibia very long, curled downward toward apex of tibia **ornata*, Meigen.
- Basal segment of hind tarsus without a fringe of long hairs on posterior surface; hair-like bristles near apex of hind tibia short, almost straight *ochrogaster*, Thomson.
18. Abdomen with three series of dark spots on dorsum, which in the black species are best seen when the abdomen is viewed from behind 19.
- Abdomen with a more or less distinct dorso-central black vitta, which is usually dilated on each tergite, forming a sub-triangular spot when so dilated 24.
19. Hind tibia with very long soft hairs on ventral surfaces *pusio*, Wiedemann.
- Hind tibia without long soft hairs on ventral surfaces 20.
20. Legs entirely black or the knees only pale 21.
- Legs largely yellowish 23.
21. Hind femur with a distinct swelling near apex on ventral surface, the series of bristles on the swollen part on antero-ventral surface very long, curled at apices, those on postero-ventral surface shorter and weaker. *femorialis*, Stein.
- Hind femur not noticeably swollen near apex ventrally, the antero-ventral bristles not long and conspicuous nor curled at apices 22.

22. Hind femur with one strong bristle close to apex on antero-ventral surface, and the hairs on apical third of postero-ventral surface longer than the antero-ventral bristle *trimaculata*, Stein.
 Hind femur with three or four long bristles on apical half of antero-ventral surface, the apical third of postero-ventral surface without long hairs or bristles **leucosticta*, Meigen.
23. Hind femur with a group of long hair-like bristles on a slight elevation about one-third from apex on postero-ventral surface and one or two strong bristles near apex on antero-ventral surface *benjamini*, Malloch.
 Hind femur without the postero-ventral group of hair-like bristles, antero-ventral surface with a series of three hairs on apical half, the middle one duplicated .. *conspicua*, Malloch.
24. Hind tibia without the preapical postero-dorsal bristle; mid-femur with three very strong downwardly directed bristles near middle on antero-ventral surface .. **socialis*, Stein.
 Hind tibia with the preapical postero-dorsal bristle present 25.
25. Hind femur with a conspicuous clump of fine hairs on postero-ventral surface near apex **kowarzi*, Verrall.
 Hind femur without such clump of hairs.. 26.
26. Mid-tibia with at least two antero-dorsal bristles on apical half in addition to the apical one 27.
 Mid-tibia with but one antero-dorsal bristle on apical half besides the apical one 29.
27. Glossy bluish-black species, with the wings conspicuously yellowish; hind femur with a few very short hairs at base on postero-ventral surface, without bristles on that surface; palpi of moderate size **carbonaria*, Meigen.
 Shining black species; wings not conspicuously yellowish; hind femur with some bristles on postero-ventral surface 28.
28. Mid-tibia usually with two bristles on antero-dorsal surface; palpi very small... **minutipalpis*, Stein.
 Mid-tibia usually with three bristles on antero-ventral surface; palpi normal in size **polychæta*, Stein.
29. Hind tibia with a number of rather closely placed long hair-like bristles on middle of anterior, antero-ventral, and postero-ventral surfaces **incisurata*, Zetterstedt.
 Hind tibia with from one to four shorter bristles on antero-ventral surface, the other ventral surfaces bare 30.
30. Second and third abdominal tergites largely pellucid yellow; pubescence on ventral surface of mid-tibia very short; each hind

- coxa with two setulose hairs above at apex..... **canicularis*, Linné.
- Abdomen entirely black; pubescence on ventral surface of mid-tibia usually distinct 31.
31. Hind tibia with more than two antero-ventral bristles and a series of short setulæ on antero-dorsal surface, in addition to one or more stronger bristles which are at the apex of the series; postero-ventral surface of hind femur without setulæ or bristles 32.
- Hind tibia with not more than two antero-ventral bristles 34.
32. Squamæ brownish black; abdomen with a triangular black mark on centre of each tergite extending to posterior margin.... *morrisoni*, Malloch.
- Squamæ white..... 33.
33. Abdomen with a subtriangular black mark on each tergite as in *morrisoni*; hind coxa with one or two hairs above at apex. *trianguligera*, Malloch.
- Abdomen with a linear black dorso-central vitta; hind coxa bare above at apex *depressa*, Stein.
34. Hind femur without bristles on postero-ventral surface 35.
- Hind femur with distinct bristles on at least the basal three-fourths of postero-ventral surface 39.
35. Mid-femur very stout, with very dense short bristles in more than a single series on postero-ventral surface; pile on ventral surface of mid-tibia very dense; hind tibia with one antero-ventral bristle; bases of tibiæ broadly yellow *levis*, Stein.
- Mid-femur normal, slightly constricted at or near apex, with one series of short bristles on postero-ventral surface; bases of tibiæ indistinctly or not at all yellow . 36.
36. Hind tibia with two antero-ventral bristles; some short setulæ above the antero-dorsal bristle; hind coxa with two setulose hairs above at apex **canicularis*, Linné.
- Hind tibia with at most one antero-ventral bristle; no setulæ basad of the antero-dorsal bristle; hind coxa bare at apices above 37.
37. Hind tibia without an antero-ventral bristle. *canadensis*, sp. n.
- Hind tibia with an antero-ventral bristle. . 38.
38. Abdomen with a distinct dorso-central vitta which is dilated posteriorly on each tergite, forming a series of large subtriangular black marks **serena*, Fallén.
- Abdomen without a distinct dorso-central vitta [*gra*, Stein, nec Malloch.
39. Hind femur with some very long fine bristles on apical third of postero-ventral surface. *immaculata*, n. n. (= *ni-flavibasis*, Stein.

- Hind femur with the apical third of postero-ventral surface devoid of bristles 40.
40. Hind femur with a series of about nine bristles on antero-ventral surface which become longer from base of femur to apex. **postica*, Stein.
- Hind femur with three long bristles on apical third of antero-ventral surface, the setulæ basad of them much shorter and not gradually elongated *abrupta*, sp. n.

Fannia curvipes, sp. n.

Male.—Head black, third antennal segment tawny-yellow, sometimes subfuscous. Thorax black, with greyish pruinescence on sides of mesonotum and pleura. Abdomen testaceous-yellow, a large triangle on middle of basal three tergites and all of fourth fuscous, the triangle sometimes only brownish. Legs fuscous, mid and hind femora and all of tibiæ in type largely testaceous-yellow, in one male paratype considerably suffused with fuscous. Wings greyish. Calyptre and halteres yellowish.

Frons almost linear above, orbits contiguous at middle, setulose to above middle; eyes bare; cheek not as high as width of third antennal segment; parafacial linear; arista with very short pubescence. Prealar bristle absent; sternopleurals 1:1. Hypopygium normal, the forceps about five times as long as their median thickness. Fore tibia without a median bristle; mid-coxæ without spines; mid-femur normal, with four or five long widely-spaced bristles on basal half of antero-ventral surface and a closely-placed series of about sixteen short bristles on apical half, the postero-ventral surface with a more regular series of finer bristles; mid-tibia with two broad shallow concavities on basal half of ventral surface, the apical half slightly thickened, ventral pubescence dense and of medium length on entire surface, one antero-dorsal and one postero-dorsal bristle on apical half; mid-metatarsus normal; hind femur very much curved, swollen at apex below, the swollen part with a clump of long black setulose hairs on postero-ventral side, antero-ventral surface with a complete series of fine bristles, the apical three or four longer and stronger; hind tibia with one postero-dorsal, one antero-dorsal, and four or five antero-ventral bristles; hind coxæ bare above at apices. Outer cross-vein not more than its own length from inner. Lower calyptra protruded.

Female.—Has the yellow parts more conspicuously pale

than the male, the third antennal segment always yellow; abdomen, femora, and tibiæ usually entirely yellow.

Frons silvery pruinose in certain lights, at vertex one-fifth of the head-width, wider anteriorly; orbits not shining, narrow. Hind femur with two preapical antero-ventral bristles; hind tibia with same bristling as in male.

Length 4-5.5 mm.

Type, male, Glen Echo, Md., 4. 7. 1921; allotype and seven female paratypes, 9. vii. 1921. Paratypes: one male, 1. vii. 1923; ten females, 23. vii. 1921; one female, 17. vii. 1921; one female, 16. vii. 1922; all from Glen Echo, Md.; one female, Cabin John, Md., 31. vii. 1921; all taken by the author.

I found the females very abundant on various dates besides those that I took the specimens on, in all cases upon a species of fungus of the genus *Agaricus*.

Fannia pallidiventris, sp. n.

Male.—Black, slightly shining. Head fuscous, orbits, face, and cheeks whitish pruinose; apex of second antennal segment rufous. Thorax densely brownish grey-pruinose, not vittate. Abdomen largely or entirely testaceous, the extreme base and apical half more or less infuscated, the dorsum with a dark elongate spot in centre of each tergite. Legs yellowish testaceous, coxæ and fore femora more or less distinctly infuscated, tarsi black. Wings clear, veins pale. Halteres yellow.

Eyes bare; narrowest part of frons about twice as wide as distance across posterior ocelli; arista almost bare; frons slightly protuberant at base of antennæ; palpi normal. Prealar bristle not duplicated; two stigmal and propleural bristles present. Abdomen elongate, tapered apically; fifth sternite transverse at apex; basal sternite setulose; hypopygium small. Fore tibia with an antero-dorsal bristle; mid-femur with a series of weak antero-ventral bristles, which are widely spaced basally and become short and closer apically; postero-ventral series longer and stronger, and a series of hairs on anterior side; mid-tibia slightly thickened from base to apex, the ventral surface with short pile, antero-dorsal and postero-dorsal surfaces each with one bristle; mid-tarsus normal; hind femur with a series of antero-ventral bristles which are weak basally, the apical three or four strong, ventral and postero-ventral surfaces with long fine hairs almost to apex; hind tibia with one long postero-dorsal, one antero-dorsal, and three antero-ventral bristles,

the preapical postero-dorsal bristle present; hind coxa with one or two hairs above at apex. Outer cross-vein much curved; veins 3 and 4 slightly convergent apically. Lower calyptra protruded.

Length 5.5 mm.

Type, Mt. Greylock, Mass., 25. vii.; paratype, Mt. Ascutney, Vt., 11. vii. 1908 (*C. W. Johnson*). Type in collection of Boston Society of Natural History.

Fannia canadensis, sp. n.

Male.—Deep black, shining. Thorax not vittate. Abdomen with brownish pruinescence, the series of dorso-central black triangular marks large but poorly defined. Legs black. Calyptræ and their fringes brown. Halteres pale brown.

Structurally similar to *serena*, Fallén, but stouter, and the hind tibia without an antero-ventral bristle.

Length 3.75 mm.

Type, Gold Rock, Ontario, Canada, 21. vii. 1908 (*H. H. Newcomb*).

Fannia abrupta, sp. n.

Male.—Similar to the last species in colour. Differs in having the dorsal vitta on abdomen more distinct and less widely dilated on posterior margin of each tergite.

Structurally similar to last species, but not so robust, and the hind tibia has a distinct antero-ventral bristle. The species may be distinguished from its allies by the presence of bristles on postero-ventral surface of the hind femur from base to beyond middle, and from *postica*, Stein, which it most closely resembles by the characters cited in the key.

Length 4 mm.

Type, Mt. Washington, N.H., 8. vii. 1914 (*C. W. Johnson*).

Fannia flavitibia, Stein.

This species is a synonym of *tibialis*, Malloch, described in 1913 from Kaslo, B.C. Stein's specimens came from Moscow, Idaho.

Fannia minuta, Stein.

In recording *flavibasis* in his paper in which the preceding species was described*, Stein states that six males which he

* Arch. für Naturges. Abt. A, Heft 9, 1918 (20. vii. 1920), p. 44.

has possess a fasciculus at base of the mid-metatarsus, and that if the type of *flavibasis* has no such fasciculus these specimens may be known by the name *minuta*! The type of *flavibasis* has a fasciculus.

Fannia nigra, Stein.

I described a Scotch species of this genus under this specific name about a dozen years ago in the 'Entomologist's Monthly Magazine.' I therefore rename Stein's species *immaculata*.

Fannia fuscitibia, Stein.

This species was described from a female, and cannot be placed in the key to males given herein.

Fannia leucosticta, Meigen.

The specimens identified as *brevis*, Rondani, which species is a synonym of *leucosticta*, are not that species, but *trimaculata*, Stein, judging from the specimens bearing his label which I have seen. So far as I know, *leucosticta* does not occur in America.

Fannia polychæta, Stein.

The male specimen named *polychæta*, Stein, by Stein is *minutipalpis*, Stein. The latter is common in America, while the former I have not seen from this country.

Fannia splendida, Stein.

A synonym of *ochrogaster*, Thomson.

XLIX.—A new Species of Thrips from India.

By RICHARD S. BAGNALL, F.R.S.E., F.L.S.

I UNFORTUNATELY omitted the description of this species in Part XIII. of my "Brief Descriptions of new Thysanoptera" (Ann. & Mag. Nat. Hist. ser. 9, vol. xii. pp. 624-631), and, as it may be some time before I can make a further contribution to that series, I think it advisable to publish now.

Thrips pallidulus, sp. n.

♀.—Length 0.9 mm.

Pale yellow; fore-wings brownish, except basally; antennæ with joints 1-2 clear, 3 yellowish, 4 lightly tinged

with grey-brown distally, and 5-7 light grey-brown (it is difficult to give a more exact description of colour in specimens that have been kept in spirit for many years).

Head nearly as long as broad, eyes rounded and coarsely faceted, with deep purplish-black pigmentation; cheeks slightly swelling, scabrous or with deep striations; interocular setæ and postocular series comparatively short, colourless. Antennæ more than twice as long as the head, two basal joints markedly broader than the following; joints 3 and 4 approximately subequal, 5 somewhat shorter, and 6 distinctly longer than 4; style rather short.

Pronotum about as long as the head and 1.4 times as broad as long, widest behind; postero-angular bristles about 0.5 the median length of the pronotum. Fore-legs stout, hind-legs long. Costa of fore-wing with 15-18, lower vein with 7-9, and distal half of upper vein with 2, 3, or 4 equidistant bristles, which are longer than the breadth of the wing near middle.

End of abdomen sharply pointed, apical bristles long and pale. Posterior margin of eighth tergite with comb.

♂.—Length 0.75 mm.

Very like the ♀. Tergite 9 with two pairs of dorsal bristles set in minute tubercles more or less on one plane and equidistant, the outer pair apparently longer than the inner (but difficult to determine in the single preparation).

Hab. INDIA, Pusa, Bengal (*coll. Lefroy*); several ♀ ♀ and 1 ♂.

L.—Descriptions of new Genera and Species of Trinidad and other S. American Noctuidæ. By Sir G. F. HAMPTON.

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[THE following descriptions were made, but left unpublished, by Sir George Hampson at the Natural History Museum. As a 'Catalogue of the Moths of Trinidad' is in course of preparation, and all of these new species are contained therein, it is necessary to have the descriptions published as soon as possible, so that the references can be inserted.—W. J. KAYE.]

Genus PSEUDABRYDIA, nov.

Type, *P. japeta*.

Proboscis fully developed; palpi upturned, the 2nd joint
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reaching to vertex of head and moderately scaled, the 3rd moderate and thickly scaled; frons smooth; eyes large, round; antennæ of male ciliated; thorax clothed almost entirely with scales, the pro- and metathorax with spreading crests; tibiæ fringed with long hair; abdomen with dorsal crests on three basal segments, the crests on 2nd and 3rd segments divided. Fore wing with the apex rounded, the termen evenly curved and strongly crenulate; veins 3 and 5 from near angle of cell; 6 from upper angle; 9 from 10 anastomosing with 8 to form the areole; 11 from cell. Hind wing with the cell about one-third length of wing; veins 3, 4 from angle; 5 fully developed from just above angle; 8 anastomosing with the cell near base only.

Pseudobarydia peratopis, sp. n.

♂. Head and thorax grey-brown mixed with whitish; antennæ brown; palpi and tibiæ with some blackish scales; tarsi blackish with pale rings; abdomen whitish suffused with brown, the crest on 2nd segment browner. Fore wing whitish suffused with red-brown, the ante- and postmedial areas suffused with greyish fuscous. A subbasal black striga from costa with a fuscous shade beyond it from costa to submedian fold; antemedial line black, angled outwards in cell and submedian fold, excurved and almost obsolete above inner margin; a faint brownish bar from middle of costa; postmedial line with brownish mark at costa, black below vein 8 and slightly dentate to vein 4, then somewhat oblique and slightly sinuous; subterminal line ochreous white, rather diffused, waved, excurved below vein 7, where there is a black spot on it, and excurved at middle. Hind wing ochreous suffused with red-brown, the terminal area browner; traces of two oblique brown lines on medial area; postmedial line slight, dark, minutely waved, faintly defined on each side by whitish; an indistinct rather diffused brown subterminal line slightly defined on outer side by whitish, from discal fold to tornus. Underside whitish irrorated with red-brown, the inner area of hind wing yellowish; fore wing with two indistinct red-brown medial lines and a postmedial line, a fuscous subterminal shade expanding towards costa and with its outer edge indented at vein 5, with diffused white beyond it except towards costa. Hind wing with slight brown discoidal spot, median line excurved below costa, postmedial line, and broad fuscous subterminal shade, the area beyond it whiter.

Hab. VENEZUELA, Esteban Valley, Las Quiguas (*Klages*), 1 ♂ type. *Exp.* 56 mm.

Barcita zaleodes, sp. n.

Head, thorax, and abdomen bright red-brown mixed with some ochreous white, the last with the crests on medial segments black; tarsi black-brown ringed with yellowish white. Fore wing ochreous white suffused and irrorated with bright red-brown; traces of a pale sinuous subbasal line from costa to submedian fold, defined on each side by red-brown; a red-brown antemedial band with some dark brown on it, below the cell oblique and distinctly marked with black-brown, a small black spot on its outer edge in the cell; reniform with white annulus, angled inwards on median nervure, a dark brown patch beyond; two slight brown marks at middle of costa and a faint red-brown shade from subcostal nervure to inner margin, expanding on outer side below the reniform; postmedial line indistinct, dark brown, oblique towards costa; incurved at discal fold to the patch beyond the cell, incurved and slightly sinuous below vein 4; traces of a pale sinuous subterminal line with dark brown spots on its inner side above and below vein 7 and below veins 4, 3, 2, angled outwards at vein 4, then incurved; a series of slight blackish lunules before termen. Hind wing ochreous white suffused and irrorated with red-brown, the terminal area much whiter except towards apex; postmedial line strong, dark brown, excurved to discal fold and above inner margin, and incurved between those points, a deeper red-brown shade between it and the dark subterminal line, which is somewhat maculate towards costa, then incurved and angled outwards at vein 4; small dark brown spots before termen above and below vein 7, and a waved line from vein 6 to inner margin. Underside ochreous white irrorated and striated with red-brown; fore wing with small blackish spot in middle of cell, and discoidal lunule defined by brown, a slightly waved postmedial line excurved to vein 5, then oblique, rather diffused, curved subterminal line and series of points before termen; hind wing with small dark discoidal spot, slight medial line excurved below costa, then sinuous waved postmedial line, subterminal shade, and series of points before termen.

Hab. TRINIDAD, Caparo, 1 ♀; BR. GUIANA, Demerara (Rodway), 1 ♀; BRAZIL, Rio Janeiro, 1 ♂ type. *Exp.* 38-42 mm.

Stibara curvilineata, sp. n.

Stibara costiplaga, Druce, Biol. Centr.-Am., Het. i. p. 296 (nec Wlk.).

Head and thorax grey tinged with red-brown and mixed

with black-brown, the tegulae black-brown except at tips; tarsi blackish with pale rings; abdomen ochreous white suffused with red-brown, the basal crest tipped with blackish. Fore wing grey suffused with red-brown and irrorated with black; a patch of blackish suffusion on basal costal area extending to submedian fold where it is defined by a black streak, the blackish antemedial line defining its outer edge inwardly oblique from discal to submedian fold, then obsolescent and excurved above inner margin; orbicular defined by whitish, large, round; reniform with whitish annulus and its centre defined by black, some black suffusion beyond its lower extremity; an indistinct dark medial line, oblique to the reniform and sinuous below the cell, a small rufous spot on it at submedian fold; postmedial line double, black, the inner line dentate, the outer even, oblique to vein 6, then evenly oblique, black streaks from it to the subterminal line below costa, above and below vein 5, and at submedian fold, the costa beyond it blackish with whitish points; subterminal line whitish, defined on inner side by black and oblique to the streak below costa, excurved below vein 7 and excurved and waved at middle; a terminal series of small black lunules; cilia with a waved blackish line through them. Hind wing ochreous white, tinged with red-brown and irrorated with dark brown, a faint discoidal spot and curved postmedial line, a dark subterminal shade and waved blackish terminal line. Underside whitish tinged with purplish red and irrorated with dark brown; fore wing with blackish spot in middle of cell and discoidal lunule, dark antemedial and medial bars from costa, diffused postmedial line excurved below costa and subterminal shade; hind wing with blackish discoidal lunule, faint medial shade, and diffused curved postmedial line.

Hab. MEXICO, Presidio (*Forrer*), 2 ♂ type, Tonalapa (*H. H. Smith*), 1 ♀, Jalisco, Bolaños (*Richardson*), 1 ♂, 3 ♀; GUATEMALA, Volcan de Atitlan (*Champion*), 1 ♀; PANAMA, Chiriqui (*Ribbé*), 1 ♀, Godman-Salvin Coll. *Exp.* 40-48 mm.

SECT. Fore wing of male with vein 2 from long before angle of cell, 8 somewhat curved downwards, the termen slightly excised towards tornus. Antennae bipectinate with moderate branches ending in bristles, mid-tibiae dilated with a fold containing a fringe of large scales.

Diomya psectrocera, sp. n.

Head, thorax, and abdomen grey-brown; the fringe of scales in fold of mid-tibiae white, the tarsi ringed with whitish; pectus behind and ventral surface of abdomen at

base white. Fore wing grey-brown; an oblique dark brown subbasal line from costa to submedian fold; antemedial line dark brown, oblique, sinuous; medial line dark brown, excurved from costa to submedian fold, then curving round the inner edge of the ocellus; reniform a large lunule defined by dark brown; postmedial line dark brown, obliquely incurved to vein 6, incurved at discal fold and below vein 4, then excurved round the outer edge of the ocellus on vein 1, which is large, black glossed with blue, with a white point in centre and yellow annulus, a patch of silvery-blue, black, and white irroration beyond it from above vein 2 to inner margin; the terminal area tinged with fuscous, except the costal area obliquely to apex and with a very indistinct dark shade representing the subterminal line, excurved below vein 7 and at middle and angled inwards at discal fold; a dark terminal line faintly defined on inner side by whitish and a fine whitish line at base of cilia. Hind wing grey-brown, the terminal area rather darker from apex to vein 5; a patch of silvery-blue irroration beyond lower angle of cell; postmedial line indistinct, dark, arising at discal fold, obliquely curved to vein 2, then waved; a sinuous whitish line before termen with a patch of silvery-blue suffusion beyond it from vein 3 to submedian fold and some blackish striæ on its outer edge, forming a small spot at vein 2; the underside pale grey-brown with small blackish discoidal spot defined by whitish and curved crenulate postmedial line.

Hab. TRINIDAD, Caparo (*Burch*), 1 ♂ type; VENEZUELA, Merida, ♂ ♀ in Coll. Dognin. *Exp.* 46 mm.

Palpi with the 3rd joint short.

Mid and hind tarsi with the 1st joint fringed with hair above, the hind tibiæ of male with tuft of very long hair from base, the fringe of hair produced to a point at extremity.

Anoba suffusa, sp. n.

♂. Head and tegulæ fiery rufous; thorax and abdomen chocolate-brown; fore legs rufous; pectus, mid and hind legs, and ventral surface of abdomen greyish brown. Fore wing dark red-brown with a slight greyish tinge; an oblique quadrate rufous antemedial patch from costa, then an inwardly oblique line across the cell and a large conical patch of fiery rufous from cell to inner margin with its outer edge excurved below the submedian fold; a rufous discoidal spot defined by chocolate-brown, small above, large and rounded below; postmedial line indistinctly double rufous and brown filled in with greyish to vein 3, oblique to vein 6, rather

inwardly oblique and slightly sinuous to vein 8, then almost obsolete and retracted to median nervure before end of cell, then chocolate-brown and erect to inner margin, a patch of rufous suffusion beyond it on costal area; subterminal line dark brown, excurved below vein 7 and at middle, angled inwards at discal fold, bent inwards below vein 8, then oblique to inner margin near tornus; a black-brown terminal line. Hind wing deep velvety chocolate-brown, the cilia rufous. Underside reddish brown slightly tinged with grey; hind wing with indistinct brown discoidal bar.

Hab. TRINIDAD (Jackson), 1 ♂ type; PERU, 1 ♂. *Exp.* 32 mm.

Osdara albicosta, sp. n.

♀. Head and tegulae black mixed with white; palpi with the 3rd joint white with some black scales towards tips; thorax and abdomen grey-brown; pectus, legs, and ventral surface of abdomen white irrorated with brown. Fore wing grey-brown, the costa white, irrorated with black-brown towards base; traces of sinuous brown antemedial and medial lines; orbicular and reniform only faintly defined by brown, the former round, the latter with slight dark points in upper and lower parts; postmedial line indistinctly double, waved, excurved to vein 4, then incurved and with a patch of black scales on it at submedian fold; a subterminal series of slight white points defined on inner side by blackish, incurved below vein 8; a series of black points before termen; cilia dark brown at tips. Hind wing grey-brown slightly irrorated with dark brown; two blackish discoidal points; postmedial line indistinctly double, brown, waved, incurved below vein 4 and with a patch of black scales on the outer line at submedian fold; a subterminal series of white points defined on inner side by small black marks; a series of black points before termen and terminal series of striae. Underside of fore wing red-brown, the costal area broadly white irrorated with brown, the inner area white, a dark point in middle of cell and slight discoidal striga, postmedial line brown, dentate, excurved below costa, then oblique and with a red-brown shade beyond it from below costa to vein 3, traces of a whitish subterminal line angled outwards at vein 4; hind wing whitish tinged and irrorated with red-brown, the terminal area more suffused with red-brown, a sinuous brown antemedial line, black discoidal point, indistinctly double curved slightly waved brown postmedial line, and subterminal series of white points defined on inner side by brown.

Ab. 1. Fore wing with a white spot before the blackish patch beyond the postmedial line at submedian fold; hind wing with series of slight white marks beyond the postmedial line.

Hab. PANAMA, Lino (*Fassl*), 1 ♀ type; TRINIDAD (*Jackson*), 1 ♀. *Exp.* 40 mm.

Hind wing with the termen slightly crenulate.

Oxidercia nigrirena, sp. n.

♀. Head and thorax whitish suffused with rufous; antennæ whitish, tinged with brown except towards base; palpi brown-rufous, the 2nd joint white at extremity, the 3rd white irrorated with brown; abdomen and pectus whitish irrorated with rufous; fore legs white mixed with brown, the mid and hind legs bright rufous, the tarsi white. Fore wing bright rufous; antemedial line indistinct, brown, angled outwards below costa, then waved; a small round grey spot defined by blackish in middle of cell; reniform figure-of-eight-shaped, defined by blackish and filled in with black except above; an indistinct waved rufous medial line; postmedial line slight, brown faintly defined on outer side by grey, very slightly waved, obliquely excurved to vein 4, then incurved, some white points with red-brown between them beyond it on costa; a curved subterminal series of black points defined on outer side by white; a series of minute black points before termen and terminal series of striæ. Hind wing bright rufous; a faint antemedial brown line from cell to inner margin; a white discoidal mark irrorated with and defined by brown, constricted at middle and with dark point in lower part; postmedial line brown defined on outer side by white with rather diffused brown beyond it below vein 2, slightly waved and somewhat excurved beyond lower angle of cell; a subterminal series of black points defined on outer side by white; a series of minute black points before termen and a fine terminal line. Underside bright chestnut-red, the inner areas whitish, the stigmata white with two dark points on the discoidal stigmata of fore wing and curved striga on that of hind wing which has a rather irregular outline, the postmedial lines not waved and distinctly defined on outer side by white.

Hab. TRINIDAD, Port of Spain, 1 ♀ type. *Exp.* 36 mm.

SECR. Hind wing of male with some rough hair on upperside from discal fold at end of cell to inner margin, the termen almost straight.

Cyclopteryx laniata, sp. n.

Head, thorax, and abdomen grey tinged with brown, the tufts of hair from patagia of male white tinged with red-brown; palpi, pectus, legs, and ventral surface of abdomen pale red-brown. Fore wing grey tinged with brown; a faint brown antemedial line slightly incurved in the cell; a slight brown point in middle of cell and discoidal striga; postmedial line brown, excurved beyond the cell, then oblique, some white points beyond it on costa; a small round black-brown spot defined by white at apex, then a terminal lunulate black-brown line defined on inner side by white. Hind wing grey tinged with brown; a slight brown discoidal striga and curved postmedial line; a lunulate terminal black-brown line defined on inner side by white. Underside grey tinged with red-brown; fore wing with dark point in middle of cell and curved discoidal striga, postmedial line brown, oblique towards costa, excurved beyond the cell and in submedian interspace; hind wing with brown discoidal striga and obliquely curved postmedial line.

Hab. TRINIDAD, Caparo, 1 ♂, 1 ♀ type. *Exp.* 30-32 mm.

Orsa deleta, sp. n.

♂. Head, thorax, and abdomen whitish tinged with rufous; antennæ with the shaft whitish, the branches brown; fore legs irrorated with brown, the tarsi brownish; ventral surface of abdomen whitish. Fore wing whitish tinged with red-brown and irrorated with brown, the terminal area whiter except towards costa; antemedial line indistinct, brown, oblique to discal fold, then erect; reniform faintly defined by brown, constricted at middle, with an oblique brown striga in its lower part and a rufous shade at lower extremity, an oblique brown striga to its inner side from costa; postmedial line brown, slightly incurved below costa and at discal fold, below vein 4 incurved, slightly sinuous and almost touching the lower extremity of the reniform; slight subterminal blackish points below veins 7, 5, 4; a terminal series of slight black points. Hind wing whitish tinged with red-brown and slightly irrorated with brown, the terminal area more rufous; traces of a curved brown postmedial line; subterminal and terminal series of blackish points. Underside of fore wing whitish suffused with pale rufous except on inner and terminal areas, a small brown

spot in middle of cell and a brown shade before the reniform, the postmedial line slightly waved and excurved between veins 7 and 3; hind wing white, the costal area tinged with rufous and with two brown stræ at middle, the termen tinged with brown except towards tornus, a small subterminal brown spot on costa.

Hab. TRINIDAD (*Kaye*), 2 ♂ type. *Exp.* 32 mm.

Helia cymansis, sp. n.

♀. Head, thorax, and abdomen dark red-brown mixed with ochreous white; antennæ dark brown; frons with white bar; palpi deep chocolate-brown striated with white, the tips of 2nd and 3rd joints white; tibiæ white at base and extremities, the spurs banded dark brown and white. Fore wing ochreous mixed with dark red-brown, the terminal area suffused with dark red-brown, at inner margin extending almost to the medial line; a double curved dark subbasal striga from costa filled in with ochreous; antemedial line indistinctly double, dark brown filled in with ochreous, excurved below costa, angled inwards at subcostal nervure, then waved; a small ochreous spot in middle of cell; reniform white, defined by brown and with some ochreous before and beyond its lower part, small; an indistinct curved brown medial line; postmedial line indistinctly double, brown filled in with ochreous, the inner line forming small black-brown spots in the interspaces below discal fold, oblique and sinuous to vein 6, inwardly oblique and waved below vein 4, some ochreous points with dark brown between them beyond it on costa; subterminal line indistinct, pale, defined on inner side by small black-brown spots in the interspaces, and on outer by a black-brown spot below vein 7 and a patch at middle extending to termen, oblique, waved, excurved at middle; a waved black line just before termen, forming points on the interspaces and with some ochreous beyond it on termen. Hind wing greyish mixed with dark red-brown, the medial area dark red-brown except towards inner margin; a small white discoidal spot; a sinuous purple-grey postmedial band edged by dark lines and traversed by a dark line to vein 2, incurved at discal fold, a dark brown mark on its outer side at costa, a triangular patch between veins 7 and 4 and a wedge-shaped mark below vein 4; an indistinct waved dark subterminal line; a waved black line just before termen with some ochreous beyond it on termen. Underside dark reddish brown; fore wing striated with ochreous, the terminal area with a few stræ except towards costa, a small white spot in

middle of cell and discoidal lunule with ochreous spots before and beyond its lower extremity; hind wing striated with white, the terminal area with few strizæ, a small white discoidal lunule and incomplete curved white postmedial line.

Hab. PANAMA, Cana Mines (*Tylecote*), 1 ♀; PERU, Chanchamayo, 1 ♀ type. *Exp.* 32–38 mm.

SECT. Fore wing of male normal.

Fore femora of male below with tufts of very long hair, the tibiæ strongly fringed with hair; hind wing with the termen strongly excurved below the discal fold.

Renodes hypomelas, sp. n.

♂. Head, thorax, and abdomen dark reddish brown mixed with grey, the tegulæ dark brown, grey at tips, the antennæ blackish, the frons and palpi dark brown, the former with white line at middle, the latter with the extremity of 2nd joint and the base and extremity of 3rd white; pectus, legs, and ventral surface of abdomen grey-brown, the mid and hind tibiæ ringed with white at extremities, the abdomen with white segmental lines. Fore wing dark red-brown suffused with purple-grey; antemedial line black-brown slightly defined on inner side by whitish, waved; a dark red-brown medial line, slightly angled outwards at the veins; a rather indistinct purple-grey discoidal lunule with its centre defined by brown; postmedial line whitish defined on inner side by black-brown which is slight towards costa, then rather maculate to vein 8; oblique to vein 6, then excurved to vein 3; some white points on terminal part of costa; subterminal line whitish, oblique and faintly defined on inner side by brown to discal fold, then ochreous strongly defined on inner side by dark red-brown and less strongly on outer, excurved at middle, then incurved and again excurved above inner margin; a dark brown patch at middle of terminal area; a terminal series of small black-brown lunules and fine whitish line at base of cilia. Hind wing dark red-brown, the basal and inner areas with some grey irroration, the terminal area suffused with purple-grey; postmedial line white, defined on inner side by black-brown and on outer by a purple-grey band with a red-brown line through it to vein 8, rather obliquely curved and sinuous; a faint red-brown shade to discal fold, then a broad deep red-brown shade approximated to the postmedial line and traversed by an irregularly waved ochreous line, the shade emitting a dark red-brown patch to middle of termen; a terminal series

of black-brown lunules and white line at base of cilia. Underside uniform black-brown, thickly scaled.

Hab. TRINIDAD, Caparo, 1 ♂ type. *Exp.* 44 mm.

Glympis subterminalis, sp. n.

♀. Head, thorax, and abdomen red-brown suffused with grey, the palpi rather darker except at base; pectus and legs whitish suffused with red-brown; ventral surface of abdomen whitish irrorated with red-brown. Fore wing grey tinged with red-brown and irrorated with darker brown, a broad deeper red-brown shade beyond the postmedial line; a rather diffused red-brown medial line, arising below the costa and oblique below the cell; the subterminal shade defined on inner side by a slight oblique postmedial dark line; a subterminal series of slight dark points; a terminal series of black points. Hind wing greyish suffused with red-brown; a faint whitish postmedial line from discal fold to inner margin; a terminal series of slight dark points to vein 2. Underside of fore wing reddish brown with a slight curved dark postmedial line from costa to vein 5; hind wing whitish tinged with red-brown except on inner area and slightly irrorated with brown, a slight curved dark postmedial line from costa to vein 4.

Hab. TRINIDAD, Caparo, 1 ♀ type, *Exp.* 28 mm.

Athysania amianta, sp. n.

♂. Head white slightly tinged with red-brown, the antennæ red-brown, the palpi pale red-brown, whitish in front and at tips; thorax rufous; pectus and legs whitish tinged with rufous, the tarsi greyish brown; abdomen reddish brown, the ventral surface white, tinged with rufous towards extremity. Fore wing rufous, the terminal area paler, the costal edge pale rufous; an oblique sinuous deep rufous medial line, with bar beyond it at inner margin; a black discoidal point; postmedial line deep rufous, oblique, sinuous from below costa to inner margin; a double oblique minutely waved deep rufous subterminal line filled in with greyish and followed by an indistinct waved rufous line; an indistinct waved rufous line before termen and a slight terminal line. Hind wing dark reddish brown, the terminal area darker; cilia white tinged with rufous. Underside of fore wing dark reddish brown, the costa rufous; hind wing dark reddish brown, the costal edge and a discoidal lunule whitish.

Hab. BR. GUIANA, Demerara (Rodway), 1 ♂ type. *Exp.* 40 mm.

Genus DOLICHOSOMASTIS, nov.

Type, *D. leucogrammica*.

Proboscis fully developed ; palpi upturned, the 2nd joint reaching to vertex of head, moderately scaled in front and slightly fringed with hair behind towards extremity, the 3rd long and thickly scaled ; frons smooth, with pointed tuft of hair above ; eyes large, round ; antennæ of male with bristles and cilia ; thorax clothed with hair and scales mixed and without crests ; tibiæ slightly fringed with hair ; abdomen with dorsal crests on three basal segments, long in male. Fore wing with the apex rounded, the termen rather obliquely curved and not crenulate ; veins 3 and 5 typically from near angle of cell ; 6 from upper angle ; 9 from 10 anastomosing with 8 to form the areole ; 11 from cell. Hind wing with the cell about one-third length of wing ; veins 3, 4 typically from angle of cell ; 5 fully developed from just above angle ; 6, 7 from upper angle ; 8 anastomosing with the cell near base only.

Dolichosomastis leucogrammica, sp. n.

Cynodes dorsilinea, Dogn. Hét. Nouv. Am. Sud, vi. p. 35 (1912), nec Dyar, 1910.

♂. Head and thorax deep rufous with white dorsal stripe, oblique line behind the tegulæ and some whitish at extremities of patagia ; palpi red-brown with some grey in front and the 3rd joint grey ; pectus and legs whitish, the fore legs and mid-tibiæ suffused with red-brown, the tarsi dark brown ringed with white ; abdomen whitish suffused with red-brown and with white dorsal stripe, the ventral surface white. Fore wing rufous ; an oblique white subbasal line giving off on its inner side an oblique white line below costa to base at vein 1 ; antemedial line fine, white, oblique to submedian fold, then more oblique to inner margin ; a white discoidal striga and vein 4 streaked with white ; postmedial line white, oblique to discal fold, then inwardly oblique and below vein 3 with another white line before it ; subterminal line white, oblique to vein 6, angled inwards at discal fold where it is connected by white with the postmedial line, angled outwards at vein 4, then oblique ; a red-brown terminal line defined on inner side by white ; cilia intersected by whitish. Hind wing rufous, the extreme base white ; a dark red-brown discoidal spot with some red-brown irroration between it and inner margin ; traces of two postmedial lines formed by dark red-brown irroration, somewhat excurved beyond lower angle of cell, then rather oblique ;

subterminal line white, excurved at middle and ending on termen at vein 1; a red-brown terminal line defined on inner side by white; cilia whitish tinged with red-brown. Underside whitish tinged and irrorated with red-brown; fore wing with small dark discoidal spots, and faint double postmedial line filled in with whitish, excurved from below costa to vein 4, then oblique, a terminal series of small dark lunules; hind wing with dark discoidal spot, two curved postmedial lines, and terminal series of small lunules.

Hab. TRINIDAD, Caparo, 1 ♂; PERU, La Oroya (*Ockenden*), 2 ♂, Yahuar Mayo, 1 ♂. *Exp.* 30 mm. Type in Coll. Dognin.

Antiblemma eschata, sp. n.

♀. Head and thorax red-brown mixed with some ochreous; abdomen greyish suffused with red-brown and with slight dark segmental lines; antennæ dark brown with pale and blackish rings towards base; palpi with the 3rd joint white at base and tips; pectus and ventral surface of abdomen whitish; fore tibiæ and tarsi dark brown ringed with white. Forewing ochreous grey strongly suffused with deep purplish red-brown except on medial area; the basal area defined by a faint slightly curved purple-brown line; reniform defined by purple-brown, narrow, with a triangular patch of purple-brown suffusion above it on costa; postmedial line double, purple-brown filled in with ochreous, excurved beyond the angles of cell, then incurved to below end of cell and sinuous to inner margin, some whitish points beyond it on costa; subterminal line ochreous whitish, waved; a terminal series of small blackish lunules with ochreous-whitish suffusion before them except at middle; cilia ochreous whitish, chequered with purple-brown at tips and at veins 4, 3. Hind wing ochreous grey thickly irrorated with red-brown, a patch of dark brown suffusion at apex; a slight red-brown discoidal striga; postmedial line double, red-brown, the outer line indistinct, excurved below costa, then slightly waved; an indistinct pale waved subterminal line slightly defined on each side by red-brown; a terminal series of slight black lunules. Underside whitish tinged with red-brown; fore wing with slight dark strigæ on each side of discocellulars and faint diffused postmedial line incurved below vein 4; hind wing with slight dark discoidal lunule and rather diffused curved postmedial line.

Hab. TRINIDAD, Caparo, 1 ♀ type. *Exp.* 28 mm.

Antiblemma leucomochla, sp. n.

♀. Head, thorax, and abdomen red-brown; antennæ dark brown with white points on the shaft above towards base; palpi with the 3rd joint irrorated with whitish, white at extreme tips; pectus, hind legs, and ventral surface of abdomen white tinged with rufous, the tarsi black-brown ringed with white. Fore wing red-brown finely irrorated with whitish and dark brown except on terminal area; a white antemedial bar from costa, followed by a dark brown line defined on inner side by rufous and slightly bent inwards to inner margin; reniform defined by dark brown, narrow; a postmedial white bar from costa, then a dark brown line defined on outer side by rufous, oblique to above vein 6, then inwardly oblique, some white points beyond it on costa; a waved rufous subterminal line defined on inner side by dark brown spots in the interspaces, incurved at discal fold and below vein 8; a terminal series of dark brown lunules defined on inner side by a waved rufous line. Hind wing red-brown, finely irrorated with whitish and dark brown except on terminal area; a blackish discoidal bar; postmedial line dark brown defined on outer side by rufous, straight; a subterminal series of small rather dentate dark spots; a lunulate dark brown terminal line defined on inner side by rufous. Underside of fore wing red-brown, the inner area pale, a rather diffused straight erect brown postmedial line; hind wing whitish tinged with rufous, the terminal area red-brown, a dark discoidal bar and almost straight postmedial line.

Hab. TRINIDAD (Jackson), 1 ♀ type. *Exp.* 34 mm.

Antiblemma albizona, sp. n.

Head, thorax, and abdomen red-brown, the last with a greyish tinge; antennæ blackish with whitish points on the shaft above towards base; palpi white at tips; pectus and ventral surface of abdomen whitish; tarsi black ringed with white. Fore wing red-brown slightly irrorated with blackish; a black point in the cell near base and striga below the cell; a whitish antemedial bar from costa, then a faint rather inwardly oblique and slightly sinuous dark line; a black point in middle of cell; reniform slightly defined by blackish, narrow; an inwardly oblique creamy-white postmedial band traversed by a red-brown line arising below the costa, some white points beyond it on the costa; an indistinct pale dentate subterminal line defined on inner side by blackish and faintly on outer by brown; a terminal series of slight

black lunules defined by a pale waved line; cilia with a blackish mark at middle and whitish tips. Hind wing red-brown; a black point at lower angle of cell; an oblique creamy-white postmedial band traversed by a red-brown line; a faint pale waved subterminal line defined on inner side by slight blackish spots, incurved at discal fold and below vein 3; a waved black terminal line defined on inner side by a fine pale line; cilia whitish at tips. Underside of fore wing reddish brown, the inner and terminal areas tinged with grey, slight dark marks in middle of cell and on discocellular; a faint oblique pale postmedial line and traces of a sinuous dark subterminal line; hind wing whitish tinged and irrorated with red-brown, the inner area greyish, a black discoidal spot, diffused brown postmedial line defined on inner side by whitish, and curved subterminal line.

Hab. TRINIDAD (*Jackson*), 1 ♂, 1 ♀ type; PERU, Chagui-mayo, 1 ♂. *Exp.* 30 mm.

Amabela carsinodes, sp. n.

Head, tegulæ, and shoulders black-brown irrorated with grey; palpi ochreous at base and whitish at extreme tips; thorax and abdomen ochreous tinged with red-brown; fore legs suffused with darker brown. Fore wing ochreous tinged with red-brown and irrorated with a few black scales; faint traces of a waved antemedial line; a white point defined on inner side by black in middle of cell and two blackish discoidal points; postmedial line dark reddish brown and very oblique from apex to inner margin beyond middle, with a faint brownish line beyond it; minute subterminal black and white spots above and below vein 7, points above and below vein 5, then an indistinct oblique sinuous brown line; a fine blackish terminal line. Hind wing ochreous tinged with red-brown and irrorated with black except at base; a black point at lower angle of cell; postmedial line double, red-brown filled in with rufous, oblique; a pale subterminal band with slightly waved edges faintly defined by brown, a black point before it below vein 3; a slight brown terminal line. Underside brownish ochreous irrorated with black; fore wing with the costa tinged with rufous, a black spot in middle of cell and sinuous discoidal striga, the postmedial line fuscous black, a subterminal series of black points; hind wing with two black discoidal points, blackish postmedial line from costa to vein 6 and subterminal series of points.

Hab. TRINIDAD (*Kaye*), 2 ♀, Port of Spain (*Neuburger*), 2 ♂ type. *Exp.* 32-36 mm.

Genus *Bendisodos*, nov.

Type, *B. æolia*.

Proboscis fully developed; palpi upturned, the 2nd joint reaching to vertex of head, moderately scaled in front and slightly fringed with hair behind towards extremity, the 3rd long and smoothly scaled; frons smooth, with tuft of hair above; eyes large, round; antennæ of male with minute bristles and cilia; thorax clothed with hair and scales mixed and without crests; tibiæ slightly fringed with hair; abdomen with some rough hair at base of dorsum, but without crests. Fore wing with the apex produced and acute, the termen excised to vein 4 where it is angled, then oblique, hardly crenulate; veins 3 and 5 from near angle of cell; 6 from upper angle; 9 from 10 anastomosing with 8 to form the areole, 11 from cell. Hind wing with the cell about one-third length of wing; veins 3, 4 from angle; 5 fully developed from just above angle; 6, 7 from upper angle; 8 anastomosing with the cell near base only.

Bendisodos acygonia, sp. n.

Head, thorax, and abdomen pale red-brown tinged with grey; antennæ dark brown, white in front on basal half and with downcurved white line between their bases; tarsi ringed with whitish. Fore wing whitish suffused and irrorated with red-brown; a faint curved dark brown subbasal line from costa to submedian fold; antemedial line dark brown, defined on inner side by white at costa, obliquely curved; a white discoidal point defined by brown; an oblique white striga from middle of costa; medial line slight, brown defined on outer side by whitish, obliquely excurved to beyond the cell, then inwardly oblique; postmedial line double, brown filled in with whitish, oblique and sinuous to vein 6, then the inner line dark brown, incurved below vein 4, some white points beyond it on costa, the area between it and the subterminal line suffused with chocolate-brown from vein 5 to inner margin; subterminal line whitish, angled outwards to termen at vein 4, then strongly incurved and defined on outer side by brown; a fine brown terminal line and white line at base of cilia. Hind wing whitish suffused with red-brown; a minute white discoidal spot; an indistinct double brown line from lower angle of cell to inner margin; postmedial line whitish defined on inner side by chocolate-brown suffusion and slightly on outer side by brown, excurved between discal and submedian

folds, the area between it and the subterminal line chocolate-brown between veins 7 and 3 with a greyish line beyond the postmedial line, then with a small dark spot below vein 8 and minute spot below 2; subterminal line whitish, oblique to vein 3, then incurved and slightly waved; a fine dark terminal line and white line at base of cilia. Underside whitish suffused and irrorated with red-brown; fore wing with two sinuous brown medial lines, a minute white discoidal spot defined on outer side by dark brown, postmedial line rather maculate, dark brown, oblique and defined on outer side by whitish towards costa, then curved, subterminal line represented by white striae to vein 5 where there is a white spot beyond it and white spots with others beyond them from below vein 4 to inner margin; hind wing with triangular white discoidal spot defined by black, sinuous brown medial and postmedial lines defined on outer side by whitish, an incurved maculate white subterminal line from costa to discal fold with white suffusion beyond it, and oblique white bar from vein 2 to termen at vein 1.

Hab. TRINIDAD, Caparo, 1 ♂, 1 ♀; PARAGUAY, Sapucay (Foster), 2 ♂, 2 ♀ type; PERU (Neuberger), 1 ♀, Pozuzo, 1 ♀. *Exp.* 28–30 mm.

Obroatis rhodocraspis, sp. n.

♂. Head, thorax, and abdomen whitish tinged with rufous, the vertex of head and tegulæ deeper rufous; legs deep rufous, the extremities of fore tibiæ white, the spurs and tarsi dark brown ringed with white. Fore wing whitish tinged with rufous and slightly irrorated with black-brown, the terminal area rufous, narrowing to apex, the costal edge fulvous-red; antemedial line indistinct, blackish slightly defined on inner side by white, slightly angled outwards below costa and on the veins, reniform whitish slightly defined by dark brown and with some blackish in centre, figure-of-eight-shaped; a faint rather diffused red-brown medial line, excurved beyond the cell, then oblique; postmedial line indistinct, brown slightly defined on outer side by white, excurved below costa, then crenulate and with series of blackish points on its inner side at the veins, oblique below vein 5; traces of a subterminal series of white points in the interspaces. Hind wing whitish tinged with rufous and irrorated with black-brown, the terminal area suffused with rufous except towards tornus; an indistinct annulate dark postmedial line with series of black points before it on the veins; traces of a subterminal series of

black points. Underside whitish irrorated with dark brown; fore wing tinged with rufous except the inner area, the cell suffused with pale red; both wings with crenulate blackish postmedial line with series of black points before it on the veins, the cilia red-brown; hind wing with minute blackish discoidal spot.

Hub. TRINIDAD, Caparo, 1 ♂ type. *Exp.* 44 mm.

Oroscoptes diascia, sp. n.

♀. Head and thorax whitish suffused with rufous and with some red-brown scales, the vertex of head with some black-brown, the tegulae with black-brown band near base; abdomen black-brown, the base and anal tuft rufous; antennae black-brown ringed with rufous; palpi with red-brown bands near extremities of 2nd and 3rd joints; pectus, legs, and ventral surface of abdomen whitish tinged with rufous, the legs striated with red-brown. Fore wing with the costal area whitish suffused with rufous and irrorated with black-brown, extending to inner margin before the antemedial line, the rest of wing red-brown suffused with purplish fuscous between the medial and postmedial lines below discal fold; some black irroration on basal costal area; two oblique antemedial lines followed by a black line from cell to inner margin; a small black discoidal spot followed by a white spot; a black spot at middle of costa; an oblique sinuous blackish line from lower angle of cell to inner margin; a small black postmedial spot on costa, then a series of points defined on outer side by whitish striae towards costa, strongly excurved to vein 4, then oblique; two slight black-brown marks on costa towards apex, a minute dentate mark below vein 8, a tridentate band between veins 7 and 5 and a slight mark at submedian fold; a terminal series of black points, towards apex defined on inner side by white and with white points beyond them at base of cilia. Hind wing with the base whitish tinged with rufous and defined by a black line, the rest of wing red-brown irrorated with black; a dark brown discoidal spot with a dark shade from it to inner margin; a curved postmedial series of black points; subterminal line represented by minute dentate whitish marks defined on inner side by rufous points and by two black-brown points towards costa; a rather punctiform dark terminal line. Underside whitish suffused with rufous and irrorated with dark brown; fore wing with oblique sinuous dark antemedial line, a dark spot in end of cell and discoidal lunule both defined on outer side by white, a patch

of dark suffusion on inner medial area, a curved postmedial series of small dark spots and sinuous subterminal series of points; hind wing with diffused sinuous dark medial band, postmedial series of small spots, and subterminal series of points.

Hab. TRINIDAD, Caparo, 1 ♀ type. *Exp.* 32 mm.

Oroscoptes microdonta, sp. n.

♂. Head, thorax, and abdomen red-brown tinged with grey, the last darker, the vertex of head and base of tegulae with some black-brown scales; palpi red-brown, whitish in front, the 3rd joint whitish irrorated with black-brown and with tuft behind it black-brown; petus, legs, and ventral surface of abdomen whitish irrorated with dark brown, the fore tibiae red-brown with whitish ring at extremity. Fore wing dark red-brown slightly tinged with grey and irrorated and striated with black-brown, the costal area suffused with grey to the subterminal line; double sinuous dark brown antemedial strigæ from costa to subcostal nervure; a minute elliptical dark brown spot defined by white in middle of cell with a small irregular spot defined by greyish below it at submedian fold; a small dark brown discoidal spot with greyish striga at middle, defined at sides by white, on outer side produced to a slight point at discal fold; an indistinct dark line from lower angle of cell to inner margin, incurved below the cell and recurved above inner margin; an indistinct double brown line filled in with greyish from costa above end of cell oblique to below vein 7 and ending at discal fold; postmedial line indistinctly double, brown filled in with greyish, oblique towards costa, then obliquely curved and slightly waved; subterminal black-brown spots with whitish points on them from below costa to discal fold, then white points slightly defined on inner side by dark brown and from vein 8 to inner margin by an incurved dark brown mark; a terminal series of dark points with whitish beyond them at base of cilia. Hind wing with the base whitish defined by a black-brown line, the rest of wing red-brown tinged with grey and irrorated with dark brown, the veins with fine pale streaks; a dark line at middle of cell, meeting the subbasal line above inner margin; a dark brown discoidal spot defined on inner side by a white point and on outer by a white striga; a postmedial series of minute dark brown spots, somewhat dentate and defined on outer side by whitish towards costa, incurved below vein 4; an interrupted minutely dentate whitish subterminal line slightly defined

on inner side by brown, reduced to points below vein 4; some dark points on termen. Underside creamy white tinged with rufous and striated with dark brown; fore wing with two dark brown subbasal bars from costa, a white point in middle of cell defined on inner side by a dark point, black-brown discoidal spot defined by white and with pale striga in centre, with two dark bars above it from costa and a broad dark red-brown shade from it to inner margin, a postmedial series of minute dark brown spots defined on outer side by whitish, excurved below costa, then oblique, a subterminal series of slight white marks defined on each side by dark brown spots and below vein 3 placed on a dark brown band; hind wing with a dark brown antemedial band formed by three conjoined lines with some white between them from costa to submedian fold, a curved postmedial series of small dark brown spots, slight towards costa and conjoined below vein 8; a slight dentate whitish subterminal line defined on inner side by a dark brown band and with dark brown suffusion beyond it from vein 7 to inner margin.

Hab. TRINIDAD, Port of Spain (*Hart*), 2 ♂ type. *Exp.* 82 mm.

Subfamily DELTOIDINÆ.

Genus LOBOTORNA.

Type, *L. albapex*.

Proboscis fully developed; palpi upcurved, the 2nd joint reaching to far above vertex of head, moderately scaled in front and smoothly scaled behind, the 3rd very long, thickly scaled in front and fringed with hair behind except at extremity; frons smooth; eyes large, round; antennæ of male with long bristles and cilia, the shaft contorted at middle, with a bifid tuft of hair before it on upperside followed by a slight fringe of short hair; thorax clothed almost entirely with scales and without crests; tibiæ slightly fringed with hair; abdomen smoothly scaled and without crests. Fore wing with the costa arched towards apex which is rounded, the termen evenly curved and not crenulate; vein 3 from well before angle of cell; 5 from just above angle; 6 from upper angle; 9 from 10 anastomosing with 8 to form a long areole; 11 from cell. Hind wing with the termen excised below submedian fold, the tornus in male forming an ear-like lobe hollowed out on upperside; the cell half the length of wing; veins 3, 4 shortly stalked; 5 fully developed from above angle of cell; 6, 7 shortly stalked; 8 anastomosing with the cell near base only.

Lobotorna albapex, sp. n.

♂. Head, thorax, and abdomen red-brown, the metathorax edged with white behind, the abdomen with some white scales and white segmental lines towards extremity, the antennæ ringed with white to the tuft of hair; pectus, legs, and ventral surface of abdomen red-brown mixed with white, the tarsi ringed with white. Fore wing red-brown suffused with purple-grey especially on terminal area; antemedial line dark brown, strongly waved; a minute white spot in middle of cell and large discoidal lunule, both defined by black and the latter with rather irregular curved black striga in centre; postmedial line black-brown, strongly angled outwards below costa, then very oblique; subterminal line rather diffused black-brown with traces of a whitish line on its outer edge, a slight wedge-shaped white mark on it at costa and white bars on its outer edge above and below vein 6, oblique; a rather conical white spot on termen and cilia just below apex with a small black mark on its upper edge; a dark terminal line. Hind wing red-brown suffused with purple-grey especially on terminal area, the ear-shaped lobe at tornus whitish; a blackish postmedial line slightly angled at submedian fold; a whitish subterminal line defined on each side by blackish which is rather diffused on inner side, ending above the tornal lobe; a black terminal line to submedian fold. Underside of fore wing pale brown suffused with purple-grey, a white point in middle of cell and discoidal striga defined on outer side by blackish, a curved slightly waved dark postmedial line, a lunulate white subterminal line to vein 6 with a patch beyond it on termen, then a series of striæ; hind wing white mixed with brown, a dark discoidal striga, sinuous postmedial line, and waved white subterminal line defined on inner side by dark brown.

♀. Brighter red-brown with the patch below apex of fore wing creamy-white.

Hab. PANAMA, Canu Mines (*Tylecote*), 1 ♂ type; TRINIDAD, Port-of-Spain (*Belmont*), 1 ♀. *Exp.*, ♂ 24, ♀ 28 mm.

GENUS COREMAGNATHA, nov.

Type, *C. orionatis*.

Proboscis fully developed; palpi of male with the 1st joint upturned and hardly reaching vertex of head, moderately scaled in front and slightly fringed with hair behind at extremity, the 2nd and 3rd recurved over the head and not reaching to end of metathorax, of about equal length,

the 2nd smoothly scaled above and fringed with hair below at extremity, the 3rd clothed with rough hair on outer side, hollowed out on inner side and containing a tuft of long hair, of female the 2nd joint upturned to far above vertex of head, moderately scaled in front and fringed with hair behind except at base, the 3rd very long, with tuft of scales behind towards tip; frons smooth, with ridge of hair above; eyes large, round; antennæ of male with long bristles and cilia; thorax clothed with hair and scales mixed and without crests; fore tibiae of male and part of the tarsi covered by a sheath containing tufts of long hair, the mid and hind tibiae smoothly scaled; abdomen smoothly scaled and without crests. Fore wing with the costa arched towards apex which is somewhat produced, the termen evenly curved and slightly crenulate; vein 3 from well before angle of cell; 5 from just above angle; 6 from just below upper angle; 7, 8, 9, 10 stalked; 11 from cell. Hind wing with the cell about half the length of wing; veins 3, 4 shortly stalked; 5 fully developed from well above angle of cell; 6, 7 shortly stalked; 8 anastomosing with the cell near base only.

Coremagnatha cyanocraspis, sp. n.

♂. Head and thorax deep red-brown, the antennæ blackish, the palpi with the tuft of hair in 3rd joint red-brown; abdomen dark red-brown tinged with grey; pectus and legs dark red-brown, the tarsi tinged with grey and with pale rings. Fore wing dark red-brown slightly irrorated with silvery blue-grey especially beyond the subterminal line, the terminal area suffused with grey except towards apex; some rufous below base of costa; antemedial line dark brown defined on inner side by rufous, angled outwards below costa and excurved in submedian interspace; a curved black discoidal striga with some white scales on its outer side; a faint diffused dentate dark postmedial line, excurved from below costa to vein 3; subterminal line silvery blue-grey, arising at vein 8 to which it is bent outwards, then straight; a reddish-ochreous line at base of cilia. Hind wing dark red-brown; a straight silvery blue-grey subterminal line between discal and submedian folds, with silvery blue-grey irroration beyond it; a reddish-ochreous line at base of cilia. Underside red-brown suffused with grey; hind wing more strongly suffused with blue-grey to the subterminal line, a dark discoidal bar, indistinct curved postmedial line, and traces of a subterminal line formed by white scales.

Hab. TRINIDAD, Caparo, 1 ♂ type. *Exp.* 46 mm.

Renia nebulosa, sp. n.

♂. Head and thorax bright red-brown, the antennæ black-brown with slight whitish rings towards base, the tuft of hair whitish at tip and the shaft beyond it whitish above; abdomen dark red-brown mixed with some whitish and with whitish segmental bands towards base; pectus, fore legs, and ventral surface of abdomen ochreous mixed with some red-brown, the mid-legs whitish, the hind legs black-brown, the tibiæ at extremities and spurs whitish. Fore wing red-brown mixed with some greyish ochreous and slightly irrorated with blackish, the costal edge rufous to beyond middle; antemedial line blackish, waved; a round greyish-ochreous spot defined by blackish scales in middle of cell and similar discoidal lunule with black striga in centre; an oblique blackish medial line with some greyish-ochreous suffusion before it; postmedial line blackish with some greyish-ochreous suffusion beyond it, slightly bent outwards below costa, then oblique and dentate; subterminal line indistinctly double, dark, dentate, angled outwards at middle, then oblique, an oblique dark shade beyond it from apex; a waved black terminal line forming black points in the interspaces. Hind wing dark purplish brown mixed with some greyish; faint dentate dark postmedial and subterminal lines and a waved terminal line; cilia ochreous tinged with red-brown. Under-side of fore wing whitish suffused with brown, the costal area whitish irrorated with red-brown to beyond middle, a blackish discoidal bar, and indistinct oblique dentate dark postmedial line; hind wing whitish irrorated with red-brown, the terminal area suffused with dark brown, a blackish discoidal lunule, dentate dark postmedial line, and indistinct dentate whitish subterminal line.

♀. Fore wing much paler and more uniform red-brown, the lines dark red-brown, the medial line more distinct and with red-brown suffusion beyond it, the discoidal lunule with small black spots in its upper and lower parts.

Hab. TRINIDAD, Caparo, 2 ♂, 3 ♀ type. *Exp.* 40 mm.

Paromia rufifusalis, sp. n.

♀. Head and thorax red-brown suffused with whitish, the antennæ and palpi rather darker; abdomen, pectus, and legs whitish tinged with red-brown. Fore wing red-brown strongly suffused with silvery purple-grey, the costal edge red-brown; a faint diffused red-brown antemedial line; a red-brown medial shade, expanding somewhat towards costa;

a broad red-brown subterminal shade, expanding to apex and with a rounded rufous patch on it between veins 7 and 4, and with a faint dark subterminal line near its outer edge, somewhat incurved below vein 3; a terminal series of slight blackish points with a whitish point below apex. Hind wing whitish suffused with red-brown; a terminal series of slight dark points to vein 2 and fine whitish line at base of cilia. Underside pale red-brown tinged with grey, the hind wing with faint red-brown discoidal lunule and curved postmedial line.

Hab. TRINIDAD, Caparo, 1 ♀ type. *Exp.* 30 mm.

Genus LOPHODELTA, nov.

Type, *L. argyrolepia*.

Proboscis fully developed; palpi upcurved, the 2nd joint reaching to above vertex of head, rather broadly scaled in front and fringed with hair behind except towards base, the 3rd long, thickly scaled except at tip; frons smooth, with tuft of hair above; eyes large, round; antennæ of male with long bristles and cilia; thorax closed almost entirely with long scales, the pro- and metathorax with spreading crests, fore coxæ and femora of male fringed with hair above, the tibiæ covered by a sheath fringed with long hair on outer side and containing tufts of hair, the mid and hind tibiæ moderately fringed with hair; abdomen with dorsal crest at base only. Fore wing with vein 3 from well before angle of cell; 5 from just above angle; 6 from upper angle; 9 from 10 anastomosing with 8 to form the areole; 11 from cell. Hind wing with the cell about half the length of wing; veins 3, 4 from angle of cell; 5 fully developed from well above angle; 6, 7 from upper angle; 8 anastomosing with the cell near base only.

A. Fore wing with small white spot in middle of cell.

- a. Fore wing without diffused band of silvery-white scales on the outer side of the postmedial line . . . *argyrolepia*.
- b. Fore wing with diffused band of silvery-white scales on the outer side of the postmedial line.
 - a'. Fore wing with the diffused band on outer side of the postmedial line formed by pale reddish and white scales *goniograptæ*.
 - b'. Fore wing with the diffused band on the outer side of the postmedial line formed by silvery-white scales only *peratostriga*.

B. Fore wing without white spot in middle of cell.

- a. Fore wing with indistinct rather maculate dark antemedial, medial, and postmedial lines *minima*.
- b. Fore wing with oblique antemedial and medial lines formed by silvery-white scales *dinemata*.

Lophodelta argyrolepia, sp. n.

♂. Head and thorax very dark red-brown with a few white scales, the antennæ slightly tinged with whitish, towards base, the basal joint pure white at extremity, the palpi white on inner side to extremity of 2nd joint and white at tips; abdomen dark brown tinged with grey, the basal crest very dark red-brown; pectus and ventral surface of abdomen whitish mixed with dark brown; legs very dark red-brown, the tarsi blackish ringed with white. Fore wing dark red-brown with a cupreous gloss; a pure white point at base and subbasal point on costa; traces of a waved brown antemedial line with a pure white point at costa; a small white spot defined by black in middle of cell and slight reddish discoidal lunule; postmedial line with a sinuous white bar from costa, thin faint, brown, with some white scales on it and waved, excurved round the discoidal annulus and with a white bar at inner margin, some white points beyond it on costa; subterminal line with three small white spots from costa, then faint, whitish, somewhat dentate, and with a white spot beyond it below vein 4; a terminal series of white points. Hind wing very cupreous brown with a slight greyish tinge; a series of whitish striæ at base of cilia. Underside grey-brown; fore wing with a series of white points on terminal half of costa; both wings with a faint pale waved subterminal line.

Hab. PERU, Chaquimayo (*Watkins*), 1 ♂ type. *Exp.* 34 mm.

Lophodelta goniograptæ, sp. n.

♂. Head and thorax very dark red-brown with a few white scales; abdomen grey suffused with brown, the basal crest very dark cupreous brown except at base; pectus and ventral surface of abdomen white tinged with red-brown; legs dark red-brown, the tarsi black-brown ringed with white. Fore wing deep red-brown mixed with some pale reddish, the basal area with whitish mixed; a rounded whitish antemedial spot below costa and dark brown spot on inner margin nearer the base, a minute white spot defined by black just beyond it in the cell; a pale reddish and silvery-white band at end of cell angled outwards beyond a slight pale reddish discoidal lunule, incurved and slightly waved below end of cell, some white points beyond it on costa; subterminal line whitish defined on inner side by diffused dark brown, bent inwards below vein 6, then somewhat dentate and with a small whitish spot beyond it below vein 4; a terminal series of small black

lunules with white points beyond them at base of cilia. Hind wing grey-brown with a cupreous tinge, the costal area whitish to beyond middle; a dark terminal line and whitish line at base of cilia. Underside of fore wing reddish brown with an oblique white bar from costa at apex; hind wing white mixed with red-brown, a diffused red-brown postmedial line and subterminal shade.

Hab. GUATEMALA, Vera Paz, Cahabon (*Champion*), 1 ♂ type, Godman-Salvin coll. *Exp.* 22 mm.

Lophodelta peratostriga, sp. n.

♀. Head, thorax, and abdomen red-brown with a cupreous gloss, mixed with some whitish, the antennæ blackish, the basal joint white at extremity, the palpi with the 3rd joint black, white at base and extremity; pectus, legs, and ventral surface of abdomen white mixed with black-brown, the tarsi black ringed with white. Fore wing red-brown with a cupreous gloss, slightly mixed with whitish: antemedial line indistinct; dark, incurved in the cell and at vein 1 and excurved in submedian interspace; a minute pure white spot defined by black in middle of cell and a slight pale reddish discoidal lunule with some black points on its edges; postmedial line dark defined on outer side by diffused silvery-white scales angled outwards beyond the discoidal lunule, then retracted to origin of vein 2 and sinuous to inner margin; some white points on postmedial part of costa; subterminal line represented by a yellowish white spot with a minute black streak on it on costa just before apex, white spots above and below vein 7, then a faint pale line with obscure blackish marks on its inner side, incurved below vein 4; a terminal series of small black spots with whitish points beyond them at base of cilia. Hind wing red-brown tinged with grey. Underside of fore wing reddish brown tinged with grey, a whitish spot on costa just before apex and white subterminal spot above vein 7; hind wing white thickly irrorated with red-brown, the terminal area more suffused with red-brown.

Hab. BRAZIL, Rio Janeiro, 1 ♀ type. *Exp.* 20 mm.

Lophodelta minima, sp. n.

♂. Head and thorax cupreous red-brown mixed with some whitish, the antennæ blackish, the palpi with the 3rd joint white at base and tips, abdomen white mixed with brown, the basal crest black with a metallic gloss; pectus and

mid and hind legs white mixed with brown, the fore legs red-brown. Fore wing red-brown with a cupreous gloss, mixed with some whitish, and slightly irrorated with silvery-white scales, indistinct somewhat maculate waved dark antemedial, medial, postmedial, and subterminal lines; some white points on postmedial part of costa; a terminal series of small rather triangular blackish spots. Hind wing whitish strongly suffused with cupreous red-brown. Underside uniform whitish suffused with reddish brown.

Hab. PANAMA, Cana Mines (*Tylecote*), 1 ♂ type. *Exp.* 22 mm.

Lophodelta dinemata, sp. n.

♀. Head and thorax deep red-brown; abdomen red-brown tinged with grey, the basal crest tipped with dark scales glossed with metallic blue; pectus, legs, and ventral surface of abdomen white mixed with red-brown, the tarsi blackish ringed with white. Fore wing deep red-brown sparsely irrorated with blue-white scales; a rather diffused, inwardly-oblique, blue-white antemedial line from costa to vein 1; a fine rather inwardly oblique and almost straight silvery-white median line with some blue-white scales just beyond it on the discocellulars; some white points on postmedial part of costa; subterminal line very faint, pale with diffused dark red-brown before it, excurved at middle and bent inwards above and below middle; a terminal series of slight dark lunules with some white scales beyond them at base of cilia. Hind wing cupreous red-brown with a fine whitish line at base of cilia. Underside of fore wing red-brown tinged with grey; hind wing whitish suffused with red-brown, the terminal area darker, a curved red-brown postmedial line.

Hab. TRINIDAD, Caparo, 1 ♀ type; BR. GUIANA, Rockstone (*Kaye*), 1 ♀. *Exp.* 26-30 mm.

Genus EUTRINITA, nov.

Type, *E. ferruginea*.

Palpi porrect, almost straight, extending about twice the length of head, moderately scaled below, the 2nd joint fringed with long hair above towards extremity, the 3rd with tuft of scales above; frons smooth, with large tuft of scales above; eyes large, round; antennæ of male with bristles and cilia; thorax clothed with hair and scales mixed and without crests; fore femora of male with a tuft of hair above towards extremity, the tibia covered by a thickly scaled sheath, the

mid and hind tibiae slightly fringed with hair; abdomen with dorsal crest at base only. Fore wing with the costa slightly arched towards apex which is somewhat produced, the termen oblique below vein 4, not crenulate; veins 3 and 5 from near angle of cell; 6 from upper angle; 9 from 10 anastomosing with 8 to form the areole; 11 from cell. Hind wing with the termen somewhat excised at discal fold and angled at vein 4, the tornus obliquely truncate; the cell about half the length of wing; veins 3, 4 from angle of cell; 5 fully developed from well above angle; 6, 7 from upper angle; 8 anastomosing with the cell near base only.

Eutrinita ferruginea, sp. n.

♂. Head and thorax whitish suffused with rufous, the antennae fuscous, except above towards base; abdomen yellowish white, dorsally suffused with fuscous except the two basal segments which are tinged with rufous; pectus and legs white tinged with rufous, the fore and mid tibiae and tarsi blackish in front. Fore wing rufous with some deeper rufous irroration, the basal, postmedial, and terminal areas suffused with pinkish white; an almost straight dark red-brown subbasal line defined on inner side by white; antemedial line white slightly defined on outer side by dark brown, waved; a whitish point defined by dark brown in middle of cell, and large discoidal lunule with grey centre and white annulus, defined on inner side by blackish and on outer by deep rufous, constricted at middle; postmedial line white defined on outer side slightly by blackish, excurved from below costa to beyond the cell and interrupted by the upper part of the discoidal lunule, incurved below vein 4 and almost touching the lower extremity of the lunule, some white points beyond it on costa with deep rufous between them; subterminal line white defined on outer side by deep rufous, slightly incurved below costa, angled inwards at discal fold and outwards at vein 4, then oblique; a series of black-brown points before termen, defined on outer side by white; a fine deep rufous terminal line; cilia rufous, white at base and tips. Hind wing with the basal half pale rufous irrorated with deep rufous, the terminal half whitish suffused with pink and irrorated with dark scales; a small deep rufous discoidal spot defined by whitish; postmedial line white defined on inner side by deep rufous, excurved to vein 4, then incurved to vein 1 and slightly sinuous to inner margin; an almost straight creamy-white subterminal band, defined on outer side by deep rufous and ending on termen

at submedian fold; a series of black-brown points before termen to vein 2, defined on outer side by white; a fine deep rufous terminal line to vein 2; cilia rufous, white at base and tips. Underside of fore wing pinkish rufous, the inner margin white, a series of blackish points before termen defined on outer side by white; hind wing creamy white, the costal and terminal areas pink, a minute pink discoidal point, curved postmedial line, and whitish subterminal line from discal fold to termen at submedian fold.

Hab. TRINIDAD, Caparo, 1 ♂ type. *Exp.* 30 mm.

SECT. Palpi of male with the 2nd joint curved into a semicircle and with the hair on its inner side forming a hollowed-out ear-like orifice, the third joint very short and recurved.

Aglanice otignatha, sp. n.

Metina hirtipalpis, Druce, Biol. Centr.-Am., Het. i. p. 437 (part.).

♂. Head and thorax red-brown tinged with grey and mixed with some dark brown, the antennæ blackish above, the palpi black-brown and whitish, the orifice on inner side of 2nd joint fuscous; abdomen reddish brown strongly tinged with grey, the basal crest mostly black; pectus, legs, and ventral surface whitish mixed with grey-brown, the coxæ with some reddish hair, the fore legs grey-brown, the tarsi ringed with white. Fore wing grey tinged with red-brown and irrorated with dark brown, the postmedial area deep red-brown, arising obliquely from apex; antemedial line with an oblique dark bar from costa, defined on inner side by white, then indistinct and angled outwards in submedian fold; an oblique dark fascia across end of cell to lower angle and white discoidal striga defined on inner side by dark brown with an oblique brown shade above it from costa and a minute black spot defined on outer side by whitish at its lower extremity; postmedial line white defined on inner side by red-brown, bent outwards below costa, then oblique and slightly excurved beyond lower angle of cell, some white points beyond it on costa; subterminal line dark brown defined on outer side by white towards costa then by deep rufous, oblique, very slightly incurved at discal and submedian folds; the area beyond it irrorated with white and with a blackish spot at middle; a minute triangular black spot on termen below apex, then a slightly waved line; cilia blackish and white with a white line at base. Hind wing reddish brown tinged with grey; a fine blackish terminal line; cilia white, chequered with dark brown to

vein 2. Underside of fore wing grey-brown with a slight reddish tinge; hind wing white slightly tinged with reddish brown, rather more strongly on costal area and on terminal area to vein 2.

♀. Head, thorax, and abdomen white mixed with brown; fore wing white mixed with dark brown and some red-brown, the postmedial shade darker and not extending to the postmedial line; hind wing white suffused with brown except on costal area, a faint oblique brown postmedial line and a faint slightly waved whitish subterminal line defined on each side by brown.

Hab. GUATEMALA, Vera Paz, Tamahu (*Champion*), 1 ♂, Cahabon (*Champion*), 1 ♂ type, Godman-Salvin Coll.; JAMAICA (*Kaye*), 2 ♂, Castleton (*Kaye*), 4 ♂, 1 ♀, Gordontown (*Kaye*), 1 ♂, Moncague (*Walsingham*), 1 ♂; CUBA, Santiago (*Schaus*), 1 ♂, 1 ♀, Baracoa (*Schaus*), 4 ♂; TRINIDAD (*Kaye, Jackson*), 2 ♂, 1 ♀, BR. GUIANA, Demerara (*Rodway*), 3 ♂, 1 ♀, Rockstone (*Kaye*), 2 ♂; BRAZIL, Amazons, Breves (*Austen*), 1 ♀, R. Jamunda (*Trail*), 1 ♂. *Exp.*, ♂ 30-32, ♀ 24 mm.

LI.—*New Argynnis Races and Notes.*

By H. T. G. WATKINS.

RECENT work of some months' duration on the large collection of *Argynnis* at the British Museum has revealed a few races which apparently require naming, and has suggested to the author some points for the consideration of other students, supplementary in part to what may be found in "Seitz."

Argynnis cydippe leechi, subsp. n.

This, the race of *cydippe* (*adippe*) from W. China, is nearer to *locuples*, Butler, from Japan, with which Leech included it, than to the intervening *vorax*, Butler, from E. and C. China. The latter (type, Shanghai) is the large and handsome race which the B.M. have from Ningpo to Peking on the coast, from Kiukiang on the Yangtze, and Changyang in Hupeh. It is distinguished by its large size (exp. 75-80 mm.), pointed wings, pale green underside with the terminal silvery spots entirely obsolete in the ♂, but extremely vivid and distinct in the ♀. In the latter the band containing the subterminal row of silver points in rust-coloured

spots is a dull dark green with hardly a trace of buff ground-colour. The Japanese races, *pallascens*, Butler (type, Hakodate), and *locup'es*, Butler (type, Nikko), are closely allied, and grade entirely into one another, *pallascens* being the paler, less richly marked form from the N. Island. Both have still more pointed wings than *vorax*, but are less tawny above and rather more heavily marked with black, as well as smaller; the underside is less green, and a characteristic is the prominence of the rust spots, which in the ♀ form a continuous band. The terminal spots are silvered in both sexes. The new race has the more richly tinted underside and slightly more rounded fore wing of *vorax*, but the ♂♂ have the terminal silver spots distinctly showing as in *locuples*. It differs markedly from *xipe*, Gr. Gr., from Amdo in N.E. Thibet, of which the type is in the B.M.; this is more tawny and less heavily marked above, and far less distinctly marked underneath, where on the hind wing there is a pale greenish base, only very slight traces of the rust-coloured spots, and a nacreous tint over the whole wing obscuring the silver spots.

Types (♂ ♀) and co-type (♂) in Brit. Mus. from Tutsien-lu, Sze-chuen, at 8300–10,000 feet, July 1889 and 1890 (*A. E. Pratt*).

The Leech coll. contains also 2 ♂, 7 ♀ of the same from other localities in Szechuen at elevations of from 5000–10,000 feet, in June, July, and August.

Argynnis cydippe aglaiaformis, subsp. n.

This name in MS. is attached to six ♂ from Korniloff, on the coast in the Maritime Province of Amurland, about 50 miles S. of Vladivostok, taken by T. B. Fletcher, July 22, 1897, and July 9, 1899. These differ from all but one of our Amurland ♂♂ in the heavier black markings above and in the bright and distinct silver spots beneath, which fail in one specimen only, whereas in what we have as *chrysodippe*, Stgr., from various places in Amurland, only one ♂ is fully silvered. In the absence of any information as to the type or type-locality of *chrysodippe*, which Staudinger says varies greatly, it may be rash to publish this new name. The true Korean race, *xanthodippe*, Fixsen (type, Pung-tung), is, as noted by its author, near *vorax*, but rather smaller, and quite unlike this. *Chrysodippe*, if we have rightly identified it, much more resembles typical *cydippe* from Europe, especially those faintly-silvered Spanish forms (*cleodippe*, Stgr.) with which the author compared it.

Argynnis laodice fletcheri, subsp. n.

A MS. name—*purpurascens*—is on 2 ♂ taken also by Fletcher at Korniloff, July 22, 1897. They differ in smaller size and paler colouring from what appears to be the Korean race represented by specimens of both sexes from Possiet Bay, Gensan, and the N.W. coast, and are transitional to other ♂ ♂ from Chabarofka and Nicolaievsk. The name *purpurascens* is inadmissible, being preoccupied in N. America for a race of *A. hydaspe*, Boisil.; so I propose for these specimens the name *fletcheri*, in honour of their discoverer, the present Imperial entomologist in India, who obtained many interesting specimens for the British Museum while serving as a naval officer.

Argynnis laodice ferruginea, subsp. n.

Distinguished from *japonica*, Ménétries, from N. Japan, by the rust-coloured (not pink or claret) outer two-fifths of the hind wing beneath, traversed by a silver-grey sub-terminal shade. Above the heavy black markings are nearly as in *ariana*, Fruh., from S. Japan, but round the cell of hind wing still more heavy; the bases, too, are more shaded; the size, however, is much less—that of a small *japonica* (exp. 66 mm.).

Type ♀ (and co-type) in Brit. Mus. from Darine, near Korsakoff, Saghalien I., Aug. 25, 1906 (*M. P. Anderson*).

Argynnis cytheris falklandica, subsp. n.

This, the Falkland Islands race of *cytheris*, differs from the typical form from the Magellan Straits in the greater whiteness of the pale markings below (the costal marks of both wings and the long central dash of the hind wing), and also in the general tint of the light areas of the underside in the ♀, which have no trace of ochreous or brownish, but are whitish pink as a background to dark purplish markings. The British Museum has a series of eight pairs, including the types.

The following are general notes on *Argynnis*, based for convenience on the paging and arrangement in Seitz's 'Macrolepidoptera':—

In the Palearctic section (vol. i. p. 228):

Among the smaller fritillaries, sometimes separated generically under the name *Brenthis*, the form *perryi*, Butler, is,

I feel confident, a species distinct from *selene*, which also occurs in the Far East, though the British Museum does not possess both from the same localities. It differs from *selene* in the black markings of the upperside being at once more heavy and less suffused, standing out sharply against the clear ground-colour, so that the insect has a variegated appearance which is characteristic of it. The black spots on the termen at the ends of the veins are well marked. There is not a trace of black suffusion at the base of the wings, so that the black spot in a ~~ring~~ at the base of the cell of hind wing ~~stands~~ out as sharply above as below. The underside, too, is darker, with a more distinct dark brown patch beneath apex of fore wing.

The type is from Possiet Bay, near Vladivostok, and the species extends inland on the Amur to Blagovestchensk and west to the Kentoï apparently unchanged. Southward in Corea it becomes larger, and the underside much paler (subsp. *dilutor*, Fixsen; type from Pungtung). The genitalia of *selene* are fully described by Petersen in Mem. Acad. Sci. Petr. xvi. (8) p. 37 (1904). Captain Riley finds the tips of the claspers in *perryi* more curved and falcate, curving inwards towards the medial line of the body. .

P. 232, and vol. v. p. 424:

Improba, Butler, flies with *frigga alaskensis* (Rept. Canad. Arctic Exped. iii. pt. K, p. 14, 1921), and is almost certainly a distinct species. It is one of the rarest of *Argynnis*.

P. 1

For the species which has been usually known as *adippe*, Linné, the name *cydippe*, Linné, has, as pointed out by the Nomenclature Committee of the Entomological Society of London (Report, p. 12, 1916), six years' priority. *Adippe* was a mistaken revised name for *cydippe*, of which the type is from Sweden. To consider, first, the other European forms of this species:

(a) Fruhstorfer, in erecting a race *mainalia* (1910), from Styria etc., seems to have overlooked the very early name *bererynthia*, Poda (1761), from Gratz in that country.

(b) The specimen figured in Esper's 'Schmetterlinge,' pl. lxxiv. fig. 1, which is described in the text as coming from Regensburg, Bavaria, became the type of Borkhausen's *syrix* (1788), a valid name thereafter probably for the S. German race. Fruhstorfer's *bajuvarica*, from Allgau in the Bavarian Alps, may or may not be separable.

(c) The Far Eastern races of this species have long been

a puzzle, and it seems probable that there are three additional species (*nerippe*, Felder, *coredippe*, Leech, and *ornatissima*, Leech) which have at one time or another been confused with them.

Of these three species, (1) *nerippe*, Felder (type, "Japan"), is a large species distinguished by the less prominent androconia in the ♂ and the white spots around the apex of fore wing in the ♀, which is remarkable for the size of the black discal row of spots in both wings. The races *chlorotis*, Fruh. (S. Japan), and *megalothymus*, Fruh. (Mts. of Hondu), seem only doubtfully separable from the type; but *coreana*, Butler (type, Possiet Bay, near Vladivostok), is a well-marked paler Korean race, the underside with faint silvered spots on a pale yellowish ground-colour, with hardly any green.

(2) *Coredippe*, Leech (types from Gensan, N.E. Korea), has well-marked androconia, and is heavily marked with black in both sexes. The underside of the ♂ is unsilvered, with a pale shining (almost hyaline) ground-colour which appears to be characteristic. The ♀ ♀ are silvered almost without exception. Besides the 8 ♂, 7 ♀ from Gensan, Leech had also a ♂ labelled "Nagasaki, May 1886," and taken by himself. *Rückerti*, Fruhstorfer, from Chifu, in Shantung, I take to be a race of this, less heavily marked above, but similar beneath. The British Museum has 8 ♂, 2 ♀ of this race from Wei-hai-wei and the islands near. A larger pair from Pekin from the Christoph coll. are, I believe, this species also; they are much less black above and below.

(3) *Ornatissima*, Leech, described from 2 ♂, 1 ♀ obtained at Ta-tsien-lu in Sze-chuen at 7000-10,000 feet in June-July by A. E. Piatt, and believed by Leech to be a species, differs markedly from *cydippe leechi* from the same place. The ♂ ♂ are deeper tawny above, with more prominent androconia, and beneath they differ in the peculiar dark green, highly silvered, sharply defined underside, in which almost all trace of the rust spots is lost. All have a silver spot in the cell between the small basal and the large central one; this is not present in *leechi* at all. The toothed black markings near the termen of fore wing form a continuous jagged line in both sexes. Above, the ♀ type has a curious longitudinal dark mark in cellule 1 of fore wing, not quite extending to the first black spot.

(P. 242):

Hyperbius, Linné (not Johanson, who was only the "respondens" of the professor's thesis), has priority over *nipho* of the same author; this is corrected in vol. ix. p. 515.

In the African section (vol. xiii. p. 232) :

Excelsior has an additional race—*katangæ*, Neave (Proc. Zool. Soc. Lond. 1910, p. 28), based on a specimen taken by him at the Belgian post Msoff, 16 miles north of Kansanshi, N.W. Rhodesia, 4000–4500 feet, Jan. 30, 1907. It differs in the darker underside, the pale whitish-green ground-colour of the Ruwenzori form being replaced mainly by a dark brown. *Baumannii* is, I think, a synonym only of *hanningtoni*.

In the difficult and still imperfectly known and studied N. American section, a European student must rely almost wholly on the work of those who have examined the various types, nearly all in America. Messrs. Barnes and McDunnough, in their 'Contributions to the Natural History of the Lepidoptera of N. America,' vol. ii. (3) p. 94 (April 1913), and vol. iii. (2) pp. 74 *seq.* (Dec. 1916), have discussed many of these, and added greatly to our knowledge. The name *coronis*, Behr, is shown to belong properly to *liliana*, H. Edwards, and what we have hitherto known as *coronis* becomes *californica*, Skinner. It and *snyderi*, Skinner, from Utah, are probably both races of *halcyone*, Edwards, from Colorado. *Malcolmi*, Comstock, is a newcomer, taken in considerable numbers at Mammoth in S. California at the end of July and beginning of August 1920 by Mr. George Malcolm of Los Angeles. It has the marginal spots of the underside silvered in both sexes as in *semiramis*, but the reddish posterior projections from the central silvered row of hind wing into the subterminal pale band are reminiscent of *zerene*, Boisd. (= *monticola*, Behr). The species called *zerene* in Seitz, vol. v. p. 413, should be known as *hydaspe*, Boisd. *Behrensi*, Edwards (p. 414), seems to be one of the rarest species. *Rhodope*, Edw., and *sakuntala*, Skinner (*ibid.*), from British Columbia, are *hydaspe* races, so also is *sordida*, Wright, from Puget Sound. *Montivaga*, Behr, is a prior name for *egleis*, Boisd., while *mormonia*, Boisd. (syn. *arge*, Strecker), is a neighbouring species recognizable by the brown veins of the underside of fore wing. *Irene*, Boisd., is a good species; *hippolyta*, Edw., a *bremneri* race. *Olio*, *opis*, *artonis*, and *bischoffi*, Edwards, are all probably conspecific. *Inornata*, Edwards, described from Downieville, Calif., seems an elusive form, and may not be distinct from *rupestris*, Behr. *Juba*, Boisdual, according to a figure of the type, is conspecific with and prior to *laura*, Edwards. *Electa* and *cornelia*, Edw., are placed by Barnes and

McDunnough as one species from Colorado, with *chitone*, Edw., as the Utah subspecies.

In the Andean section (pp. 426 *seq.*) should be included the species *tessellata*, Rosenberg and Talbot, from S. Peru, described in the Trans. Ent. Soc. Lond. 1913, p. 673, and *sobrina*, Weymer, from Sicasia in Bolivia. *Lathonioidea*, Blanchard, is the earliest name for the species listed as *darwini*, Stgr., and the name *dexamene*, Boisduval, may probably belong to it. To *cytheris*, Drury, the commonest Chilean species, in which the sexes differ greatly on the underside, belong probably the names *sigae*, Hb., *valdiviana*, Philippi, *anna*, Blanchard, and *montana*, Reed.

LII.—*On living Fragments of Animals (Merizou).*

By J. D. F. GILCHRIST, M.A., D.Sc.

[Plates VIII.-X.]

RECENT physiological experiments have shown that it is possible to preserve fragments of tissue of the higher animals, such as connective tissue, in the living condition, provided they are placed in a suitable medium. Such fragments are of necessity small to allow of nutrition and oxydation, but they possess the power of growth. Growth cannot proceed very far, however, without the development of special provision (alimentary tract, blood-vessels, nerves) for nutrition and oxydation of the inner parts of the growing mass, which has now a relatively much smaller surface exposed to the nutrient medium. Failing this increase in size in such a way as to maintain an adequate surface, the growing fragments can be kept alive by artificial division into smaller masses. The experiment shows that certain tissues of an organism can, under suitable conditions, live, grow, and be propagated, apart from and without entering into the cycle of normal life.

Such a phenomenon apparently does not occur in Nature, though division or fragmentation of the body of an animal is a common enough occurrence. Various forms of asexual reproduction, such as budding and fission, illustrate this in most groups of the lower animals, but these buds or fissiparous products develop again into the normal adult, and re-enter the normal life-cycle. It is also illustrated in many

cases where for special reasons, such as escape from enemies, part of the body is thrown off, *e. g.*, the tail of the lizard, the legs of a crab, &c., but, in these cases, the tissue which is sacrificed, although it may be replaced, does not itself continue to live. There are, however, other cases in which the discarded organs apparently continue in life for some considerable time—in fact, when first met with, they were taken to be entire organisms. The large fleshy cerata of the Nudibranch *Tethys* are, for instance, examples of this. Their real nature having been discovered, it was not suspected that such fragments would continue in life for any much longer time, when separated from the parent organism, and much less that they would grow and be reproduced as fragments.

During the course of marine biological work at the Cape some further illustrations of occurrences, apparently of the same nature, have been observed.

One case was that of a gelatinous organism found in fair abundance in deep water during the course of a former survey at the Cape. At the suggestion of the late Prof. Howes, specimens were shown at the Linnean Society, without, however, eliciting any suggestions as to their nature. They have recently been found again in the course of the present survey. They are clear gelatinous objects about two inches in length, with a trace of colour at one of their pointed ends. They were found on the West Coast both in the 'Pieter Faure' and the 'Pickle' survey, and only in deep water. The 'Pickle' specimens were found in the following localities:—

(1) Nine at Station 357 (lat. $32^{\circ} 36'$ S., long. $16^{\circ} 03'$ E.), about 100 miles west of St. Helena Bay, by reversible trawl, from a depth of 900 fathoms, with a bottom of *Globigerina* ooze.

(2) Seven at Station 517 (lat. $33^{\circ} 35'$ S., long. 17° E.), about 60 miles west of Dassen Island, by reversible trawl, from a depth of 600 fathoms, with a bottom of *Globigerina* ooze. They were recorded as Holothurians, to which they have a superficial resemblance.

The 'Pieter Faure' specimens were found at the following and other localities:—

Cape Point N.E. by E. 36 miles, by shrimp-trawl, 660–700 fathoms, with a bottom of green mud.

A second case, which was somewhat more puzzling, was the repeated finding of pieces of what appeared to be part of the skin of some Holothurian (Pl. VIII.), but without any trace of other parts of the animal. They were found at the following localities:—

(1) Station 117 (lat. $29^{\circ} 54'$ S., long. $31^{\circ} 35'$ E.), $29\frac{1}{2}$ miles E. of Durban, by reversible trawl, from a depth of 250 fathoms, with a bottom of mud.

(2) Station 99 (lat. $29^{\circ} 55' 40''$ S., long. $31^{\circ} 21'$ E.), 16 miles E. of Durban, by 40-ft. otter-trawl, from a depth of 220 fathoms, with a bottom of mud, sand, and shells.

These did not appear at first to be of any particular interest, the most obvious explanation being that the fragments were the result of injuries received in the dredge or by natural enemies. The numbers, however, found in different localities attracted attention, and they were examined more carefully. There were no ruptured edges or signs of recent injury, and on making sections the minute cellular structure was well shown. The outer side of the skin was normal, the inner was smooth, white, and microscopically showed traces of an epithelium. The fragments almost invariably occurred in pairs, two being joined together at one side. The smooth inner surfaces were therefore closely applied. In Pl. VIII. the three figures represented the halves more or less separated.

The same locality was visited about three months later, in order to procure more material, and it was readily found.

The two cases seem to show that fragments of the body may continue in the living condition for some time. Beyond this fact, they do not add much new to what is already known, and could not be followed up by further observation, though an attempt was made to keep some samples of the second case in a living condition. They lived for a time, but the want of a constant supply of pure sea-water and the high temperature of the place in which they were kept (a galvanised iron shed in Durban Harbour) rendered the experiment inconclusive. The fact that they were procured from deep water is also to be taken into account.

Subsequent to these cases, which, beyond the fact of their repeated appearance and apparent persistence in the living condition, seemed hardly worth recording, another instance was found, more adapted for observation and apparently throwing further light on the subject. In the course of some attempts to secure and rear mature eggs of *Balanoglossus* (*Ptychodera capensis*), to study the development, it was noticed that the female at maturity appears to undergo a process of fragmentation, as, on some of the stones under which the animals are usually found, various stages of a disruptive process were observed. This was at first supposed to be due to some injury received by the animal in collecting, but repeated and careful raising of many undisturbed stones

showed all stages in the process. Thus, in some cases the animal was found with enlarged gonads and protruding ovarian tubes, which were readily detached. In one the ovarian region was ruptured along the inner side of the genital ridges, and, in other cases, the disruptive process was carried so far that the ovarian tubules were found lying scattered about on the stone with the skeleton of the branchial region, the tail, proboscis, and collar close by, all the fragments being securely attached to the stone by mucus. In another case, a small fragment of the genital ridges with protruding ovarian tubes was seen moving slowly over the stone by aid of its ciliated epithelium. One interesting case was found in which the ovarian tubes, about thirty in number, were found scattered at some distance (3-10 mm.) from each other on the under surface of a stone, to which they were adherent by mucus, and among them were some free segmenting ova.

The cases immediately bearing upon the question under discussion were those in which fragments of the body, without any trace of gonads, were apparently in a growing condition. These were at first sight thought to be clusters of eggs embedded in mucus, but on further examination proved to be parts of the body. Some were flat, rounded, usually more or less elongate without outgrowths; in others there were more or less well-marked pseudopodia-like projections, which seemed like growing processes (Pl. IX.). The most interesting were those in which these outgrowths exceeded the main part in bulk, and constituted a network of more or less anastomosing thread-like filaments (Pl. X.). These were carefully examined in the living condition and by sections. Some parts were provided with active cilia, but not all, and, from the free ends of some of the threads, rounded ciliated spheres, about 5 mm. in diameter, were observed to break off. Some of these, of which sections were made, showed the normal ciliated epithelium, except at the point where they had broken away. Others were completely ciliated. They moved about on the substratum at a fairly rapid rate by rotation, and were never observed swimming freely in the water. Apparently they subsequently increase in size and assume a crawling mode of progression by cilia, as various sizes, from small particles little larger than the spheres to the large reticulate form, were found. All of these, except the larger reticulate forms, were observed to be capable of a slow crawling motion over the surface of the stone, to which they were adherent by mucus.

Many such fragments were observed at various times

towards the end of the winter months, but with no indication that they again assumed the form of the parent *Balanoglossus*.

When these small fragments were first observed and found to be apparently complete organisms, consisting only of an outer epithelial layer and an inner cellular tissue, they were supposed to be some form of the Mesozoa such as *Trichoplax*. The colour and outer appearance of the epidermis, as well as the minute structure both of this and the sub-epidermal cells, however, so closely resembled those of *Balanoglossus* that a connection between the two was suggested, and this was confirmed by subsequent finding of various stages of the fragmentation of the animal as above mentioned.

It naturally suggests that the Mesozoa may not represent, as has been suggested, primitive forms intermediate between Protozoa and Metazoa, nor degenerate forms of some phylum such as the Platyhelminthes, but fragments of a more complex organism, which live as parasites, as in the case of *Dicyema*, or free in the sea-water, as in the case of *Trichoplax*. This is, indeed, implied in another suggestion which has been made that the Mesozoa are abnormal stages of development of the Metazoa, or, in other words, part of a parent organism, which does not re-enter the normal life-cycle of the animal. They have also been compared with the peculiar organisms known as "urns" found in Sipunculids, and these are believed by some authors to be parts of the organism, which have become free in the body-cavity, in which they are able to live and grow after becoming detached.

It may be noted in this connection that living leucocytes of the blood have been observed on the outside of the body in a free condition. The amoeboid cells of the coelomic cavity in Annelids and Echinoderms pass to the exterior, and, though they are supposed to perish, further observations on this point are required. The amoebocytes of *Lubricus* certainly remain alive for some considerable time after extrusion, if kept moist. In examining the luminous coelomic fluid of a *Lumbricus* for bacteria, it was found that the amoebocytes remain alive for several days in a culture medium.

The suggestion, therefore, that part of an animal may give rise to a living organism, which remains quite unlike the adult or any of its normal forms, has already been entertained, and further observations on such fragments is much to be desired. They may for convenience be called Merozoa (or Merizoa—*μῆρις*, a small part,—to avoid confusion with an

order of Cestoides), and be more definitely defined as parts of an organism which are capable of living, growing, and multiplying, without re-entering the normal life-cycle of the parent organism or any normal stage in its life-history. They may exist under artificial conditions (tissue culture), and it is suggested, though further evidence is required, that they exist under natural conditions of life.

Perhaps the fact, noticed in some cases of development, that only a part of the larval form gives rise to the adult, may indicate a similar process in certain groups of animals. In the case of *Balanoglossus*, if the typical form of the animal in the course of time be gradually suppressed, appearing only as a curtailed larval stage, while the fragmented form assumes larger proportions, we would have a similar occurrence.

The occurrence of Merizon, as so defined, is not only of interest from a physiological point of view, but has an important bearing on the question of phylogeny of animals and their evolution generally, for, if established, the possibility must be considered of a group or even phylum originating from a detached part of an already complex organism of another group or phylum. The tracing of the descent of any type, therefore, would be a much more complex question than is supposed. Again, the origin of some simple form might be from a part of a much more advanced organism. It is with a view to directing attention of those who may have the opportunity to the desirability of further observation on this subject that the above notes are published.

EXPLANATION OF THE PLATES.

PLATE VIII.

Three fragments of a Holothurian (?). In the left- and right-hand figures the two halves are opened out, so that only the outer surface is seen. In the central figure the right half has been drawn aside, to show the smooth inner surface of the left.

PLATE IX.

Photograph of branching form of tissue of *Balanoglossus*.

PLATE X.

Drawing of reticulate form of tissue of *Balanoglossus*. Ciliated spheres given off from this piece not represented.

LIII.—*A List of Carabidæ from Macao, South China, with a Description of a new Species and Biological Notes.* By H. E. ANDREWES, F.E.S., and HUGH SCOTT, M.A., Sc.D., F.E.S.

PART 1: INTRODUCTION AND BIOLOGICAL NOTES. By HUGH SCOTT.

The beetles enumerated below form part of the collection of the Cambridge University Museum of Zoology, and have recently been named, together with most of the other foreign Carabidæ of that Museum, through the kindness of Mr. H. E. Andrewes. The Macao insects were presented to the Museum some years ago by Mr. Frederick Muir, F.E.S. Those dated xii. 1906 and i. 1907 were collected in Macao or the country near at hand by Mr. J. C. Kershaw and Mr. Muir, while the examples taken in xi. 1908 were obtained by Mr. Kershaw alone.

Macao proper is a small peninsula projecting from the south-eastern extremity of a large island (Hiang-Shang or Macao Island) on the west side of the estuary of the Canton River, Hong-Kong being about 40 miles distant on the eastern side of the same estuary. These places lie at about lat. 22° N., or just within the Tropic of Cancer. A comment had previously been published by Mr. J. J. Walker, R.N., F.L.S., on the comparative fewness of ground-frequenting Coleoptera in Hong-Kong. Kershaw and Muir were therefore interested in comparing their experience in Macao with that of Walker in Hong-Kong, and they specially noted which species were found under stones. In the following list this note is attached to five species—*Desera geniculata*, *Lebia chinensis*, *Chlænium cyaniceps*, *Stenolophus smaragdulus*, var. *quinque-maculatus*, and *Tachys ovatus*,—while Kershaw also writes (in litt., 1. ii. 1924), "I remember a minute species, coarsely hairy and ant-like, usually with ants under stones," a remark which evidently refers to *Salina westermanni**. He adds, "Carabidæ in S. China seem to be plentiful under stones, both in the plains and on the hills."

Walker's allusion to the relative scarcity of ground-beetles in Hong-Kong had reference to the nature of the soil of that

* Mr. Andrewes, alluding to the fact that many remarks on this insect have been published, has called my attention to the figure, description of the genus, and discussion of the synonymy, etc., given by Alluaud, Bull. Soc. Ent. France, 1918, p. 222.

island, which is composed almost entirely of decayed granitic and porphyritic rocks: "Generally speaking, the soil is of a harsh and unkindly nature; and, except in a few places, it is of but little use searching for ground-frequenting Coleoptera; very few insects being found under stones in the cooler months, with the exception of huge wingless cockroaches of three or four species"*. In a letter dated 27. i. 1924 he has added, "I remember that beetles were as a rule very few and far between under the numerous loose blocks of granite and porphyry on the hillsides, from mid-December 1892 to May 1893; some small *Ileteromera* (*Opatrum*, etc.), Carabidæ (notably a rather fine species of *Galerita*), and a little opaque-brown Elaterid (*Meristhus scobinula*, Cand.†) . . . Other situations produced Coleoptera in sufficient abundance and variety."

At Macao the soil-conditions are not entirely similar. The hilly peninsula of Macao proper is almost entirely covered by the town, but, being situated among a network of estuarine creeks, it has in its vicinity wide stretches of low alluvial soil and mudflats. These plains are bounded by hill-ranges 1000-2000 feet high, rising occasionally to summits near 3000 feet, and the hill-soil is usually red, gritty, and friable, composed of decayed granitic rock, as Walker describes in Hong-Kong. It bears little but coarse grass, though the absence of trees is due not to the poverty of the soil, but to deforestation by the extremely dense population. Mr. Kershaw, to whom I am indebted for the above particulars, states that the Carabidæ were mostly collected, not in Macao proper, but in the adjacent islands, within a radius of about 10 miles.

As to the rest of the Macao species, not specially noted as taken under stones, Muir writes (*in litt.*, 24. xii. 1923) that they were obtained by general collecting: *Drypta lineola* (of which a number of other specimens, besides the one listed, were taken) was found mostly on rushes, a few examples on sugar-cane or sorghum; Muir believes that this insect lives on Homoptera, since the members of the genus are in other localities very partial to various "hoppers." Kershaw also recalls that the captures included one species of bombardier, "and his artillery was very effective"; doubtless referring to the undetermined

* "A Preliminary List of the Butterflies of Hong-Kong," Trans. Ent. Soc. London, 1895, pp. 433-477; the sentence quoted is on p. 435.

† Known from the tropical regions of both Old and New Worlds, including Central America; and also (*teste* Schwarz, Gen. Ins.) from Japan.

Brachynus. He adds that a small, shiny, plain black species was obtained by beating almost any foliage, including trees, and that it was about the only kind collected in that manner; but I cannot with certainty identify in the collection the species to which this statement refers.

I am greatly indebted to Mr. Andrewes for working out the material, and to Messrs. Kershaw, Muir, and Walker for placing their knowledge so freely at my disposal.

PART 2: SYSTEMATIC LIST AND DESCRIPTION OF A NEW SPECIES. By H. E. ANDREWES.

The general distribution of each species is briefly indicated, as well as the detailed record of the Macao specimens.

1. *Tachys ovatus*, Motch., Bull. Mosc. 1851, iv. p. 509.
Oriental.
2 ex., xii. 06, "under stones"; 2 ex., xi. 08.
2. *Craspedophorus mandarinus*, Schaum, Ann. Soc. Ent.
Fr. 1853, p. 436. China.
2 ex., i. 07.
3. *Chlœnius nepalensis*, Hope, Zool. Misc. 1831, p. 21.
Oriental.
1 ex., i. 07.
4. *Chlœnius bimaculatus*, Dej., Spec. Gen. ii. 1826, p. 301.
Var. *lynx*, Chaud., Bull. Mosc. 1856, iii. p. 199.
Oriental.
1 ex., i. 07.
5. *Chlœnius sinensis*, Chaud., Bull. Mosc. 1856, iii. p. 263.
China.
2 ex., i. 07.
6. *Chlœnius cyaniceps*, Bates, Trans. Ent. Soc. Lond. 1873,
p. 325. China.
1 ex., xii. 06, "under stones."
7. *Diorychs clara*, Andr., Ann. & Mag. Nat. Hist. (9) ix.
1922, pp. 290 & 292. China, Indo-China.
1 ex., xi. 08.

8. *Platytomus flavilabris*, F., Suppl. Ent. Syst. 1798, p. 59.
 Var. *thunbergi*, Quens., in Schönh., Syn. i. 1, 1806, p. 188 (note). China.
- 3 ex., i. 07.
9. *Stenolophus smaragdulus*, F., Suppl. Ent. Syst. 1798, p. 60.
 Var. *quinquepustulatus*, Wied., Zool. Mag. ii. 1, 1823, p. 58. Oriental.
- 2 ex., xii. 06, "under stones."
10. *Trigonotoma dohrni*, Chaud., Bull. Mosc. 1852, i. p. 69. Indo-China, China.
 4 ex., i. 07.
11. *Trigonotoma chalceola*, Bates, Trans. Ent. Soc. Lond. 1873, p. 328. China.
 1 ex., i. 07.
12. *Abacetus* sp.
 1 ex., xii. 06.
 I cannot trace this species in Chaudoir's Monograph on the genus, and think it probably new. Tchitcherin, however, has described a number of species in more recent times, some of which are unknown to me.
13. *Selina westermanni*, Motsch., Etud. Ent. 1857, p. 110, t. fig. 6. S.E. Asia, S. and E. Africa, Madagascar.
 1 ex., xii. 06 ; 2 ex., xi. 08.
14. *Drypta lineola*, MacL., Ann. jav. 1825, p. 27. Oriental.
 1 ex., i. 07.
15. *Desera geniculata*, Klug, Jahrb. 1834, p. 52. Oriental.
 1 ex., xii. 06, "under stones."
16. *Planetes muiiri*, sp. n.
 3 ex., i. 07.
 The description will be found at the end of the list.
17. *Macrochilus trimaculatus*, Oliv., Enc. Méth., Ins. ii. 1790, p. 347, t. clxxix. fig. 11. Oriental.
 3 ex., i. 07.

18. *Macrochilus astericus*, White, Ann. & Mag. Nat. Hist.
xiv. 1844, p. 422. China.

1 ex., i. 07.

19. *Macrochilus chaudiroidi*, Andr., Trans. Ent. Soc. Lond.
1919, p. 130. Oriental.

1 ex., i. 07.

20. *Pheropsophus nebulosus*, Chand., Mon. des Brachynides,
Ann. Soc. Ent. Belg. 1876, p. 27.

Var. *stabilis*, nom. nov. Indo-China, China.
marginalis, Schm.-Goeb. (not Dej.), Faun. Col. Birm.
1846, p. 74; Chaud., Mon. p. 84.

1 ex., i. 07.

Both Schmidt-Goebel and Chaudoir misidentified Dejean's species, and the latter added *nebulosus* as a variety. This, therefore, becomes the name of the species, and the original form will be a variety of it, for which I propose the new name given above.

21. *Brachynus* sp.

2 ex., i. 07.

I cannot identify this species in Chaudoir's Monograph, but he does not include the Palearctic Region. As I do not feel confident that it is new, I have not described it.

22. *Styphlomerus bicolor*, Boh., Eugénies Resa, Zool. Ins. iv.,
Col. 1861, p. 3.

China, Indo-China, Burma, Singapore.

1 ex., xii. 06.

23. *Aephnidius adelioides*, MacL., Ann. jav. 1825, p. 23, t. i.
fig. 7. Oriental, Australia.

1 ex., xii. 06.

24. *Tetragonoderus quadrisignatus*, Quens., in Schönh., Syn.
Ins. i. 1806, p. 212 (note). China, Indo-China.

1 ex., xi. 08.

25. *Microlestes*, sp. n.

1 ex., xii. 06.

I feel no doubt that this species is undescribed, but the specimen is in a poor condition of preservation.

26. Gen. et sp. n. near *Phlæodromius*.

1 ex., i. 07.

I am unable to identify this genus, but there is only a solitary specimen, and before describing it I should like to see further material.

27. *Lelvia chinensis*, Boh., Eugenies Resa, Zool. Ins. iv., Col. 1861, p. 6. China.

1 ex., xii. 06, "under stones."

*Description of No. 16 in the above List.**Planetes muiri*, sp. n.*Length* 10·0 mm. (excluding abdomen).

Form narrow, elongate, and flat; pubescence fairly long and conspicuous, though rather abraded. Black; buccal organs, antennæ, and legs testaceous red, the femora a little lighter, elytra with a round reddish spot on each, placed a little before middle, and extending from the middle of the second to the middle of the sixth intercostal space. *Head* (1·9 mm. wide across eyes) shiny, moderately convex, frontal foveæ short, wide, and shallow; eyes fairly prominent, setulose; antennæ thick; neck constricted, surface smooth and polished on disk, rather coarsely punctate at sides and behind. *Prothorax* (2·1 × 2·6 mm.) cordate and slightly convex, transverse, equally contracted at extremities, widest at apical fourth, base with its sides oblique; sides gently rounded, not sinuate behind, but with a faint notch before the angles, which are sharp though slightly obtuse; median line distinct but shallow, basal sulcus and foveæ fairly deep, latter extending some little way forward; surface rather coarsely punctate, less densely on disk, more so along sides and base. *Elytra* (5·6 × 2·8 mm.) flat, nearly parallel, base emarginate, apex subtruncate; primary costæ shiny, wider and much more conspicuous than the secondary ones; surface otherwise dull, the rows of punctures minute and irregular, only visible under considerable magnification.

A little smaller and narrower than *P. bimaculatus*, MacL.,

similarly coloured, but with a smaller elytral spot. Head rather narrower, the frontal impressions shallower; prothorax narrower and rather less contracted behind, the hind angles less reflexed; elytra with the secondary costæ finer, the puncturation between the costæ much finer and less visible.

MACAO (*F. Muir*), Jan. 1907, 3 ex., viz., one in the Cambridge Zoological Museum, one in my collection, while the third (type) has been placed in the British Museum.

LIV.—*New Evidence of the Relationship between the Spiders Liphistius and Segestria.* By THEODORE H. SAVORY, B.A.

IN a recent paper (*Ann. & Mag. Nat. Hist.* ser. 9, vol. x. 1922, p. 441), dealing with the primitive characters of spiders of the family Liphistioidæ from a broad biological aspect, I have indicated several obvious points of similarity between this family and the families of the Theraphosæ (*Mygalomorphæ*) or trap-door spiders. There seemed, however, at that time no striking resemblance of the Liphistioidæ to the Dysderidæ, nor, indeed, to any other of the Tubitellaridæ, with the single exception of the Oonopidæ.

Spiders of the family Oonopidæ carry a dorsal shield on the abdomen, and I stated (*loc. cit.*) my opinion that it may be possible for embryological research to prove that this shield is homologous to the characteristic primitive dorsal plates of the Liphistioidæ, and that in persisting it has lost its metamerism.

Since the appearance of this paper the genus *Liphistius* has been enlarged by the addition of two new species, described by my friend Mr. H. C. Abraham, F.Z.S.—*Liphistius batuensis* (*Journ. Malayan Branch Royal Asiatic Society*, i. p. 13, 1923) and *Liphistius malayanus* (*P. Z. S.*, Dec. 1923, p. 769). In the latter paper there is included a photograph of the nest and trap-door of the spider, and this photograph shows the most interesting relationship between the nest of *Liphistius* and the homes of the genus *Segestria* of the family Dysderidæ.

The type-species of this genus is *Segestria florentina*, Rossi, a spider which is extremely rare in England, but which I found before the War to be exceedingly common in

sea-coast towns in Brittany. I then described ('The Field,' 18th Oct., 1913) its web as follows:—

"The position selected is a crevice in a rock or wall, and in this the spider weaves a silken tube, the direction of which seems to be governed by the direction of the crack. The tube may vary in length from 3 cm. to 8 cm., and is about 7 mm. in diameter. At its mouth it widens to form a bell-shaped orifice. The silk here is several layers thick and interwoven with the remains of beetles, flies, and insects of all sorts. From the edge of the widening mouth radiate twenty to thirty plain threads of silk, symmetrically arranged, about 4 cm. long, and not connected in any way."

Now this is precisely the same arrangement as that constructed by *Liphistius malayanus*, as shown in the photograph referred to above, with, however, the exception that *Liphistius* closes the tube with a wafer trap-door. *Segestria* spins no trap-door, but, apart from this, the resemblance is perfect in every way.

Most characteristic are the isolated radiating threads. These perform manifestly a structural function in both webs, holding taut the diverging tube-mouth: it is a question whether they may not also assist in the capture of insects. The *Liphistius* is a nocturnal and a rare spider, and its habits are not as yet completely known. Of *L. batuensis* Mr. Abraham states (*loc. cit.*) that its "principal food is the grasshopper, *Paradiestrammena graveleyi*, Chop., which it would obtain by hunting along the cave-walls, and which it apparently takes to its nest to devour." Of *Segestria*, Simon (*Hist. Nat. d'Araignées*, i. p. 321) says that "les fils irréguliers rayonnants arrêtent la proie au passage." Eleven years ago, however, I failed completely on innumerable occasions to provoke any response on the part of the spider by touching these threads, while a tap on the edge of "la sorte de petite collerette" brought her out, all ferocity.

Finally, it seems justifiable to claim a closer relationship than has previously been realized between the Liphistioidæ and the Dysderidæ. The Dysderidæ are split into two subfamilies—Dysderinæ and Segestriinæ—of which the latter has the more sedentary habits. It has accordingly retained the ancestral type of nest, and with it the unusual narrow elongated sternum that is so peculiar a feature of the Liphistioidæ. At the same time it has abandoned the trap-door, and, to compensate itself for this, has adopted the peculiar habit of turning its third pair of legs forwards, by the sides of those of the first two pairs, and using, in the mouth of its tube, all six limbs against the circumstances of life.

LV.—On a remarkable new Coniopterygid Genus from Egypt (Neuroptera Megaloptera). By H. H. KARNY, Buitenzorg, Dutch East Indies.

Genus PROTOSEMIDALIS, nov.

Eyes large, touching each other, strongly faceted, without hairs. No ocelli. Antennæ moniliform, 29-jointed (in two of the specimens before me one antenna broken off at the end of twenty-seventh joint); one of the three specimens before me has both antennæ 28-jointed (not broken!). The two basal joints larger than the following ones, rounded, distinctly longer than wide, the second smaller than the first; the following joints almost quadrate or a very little longer than wide; last joint distinctly longer, conically produced in the

Fig. 1.



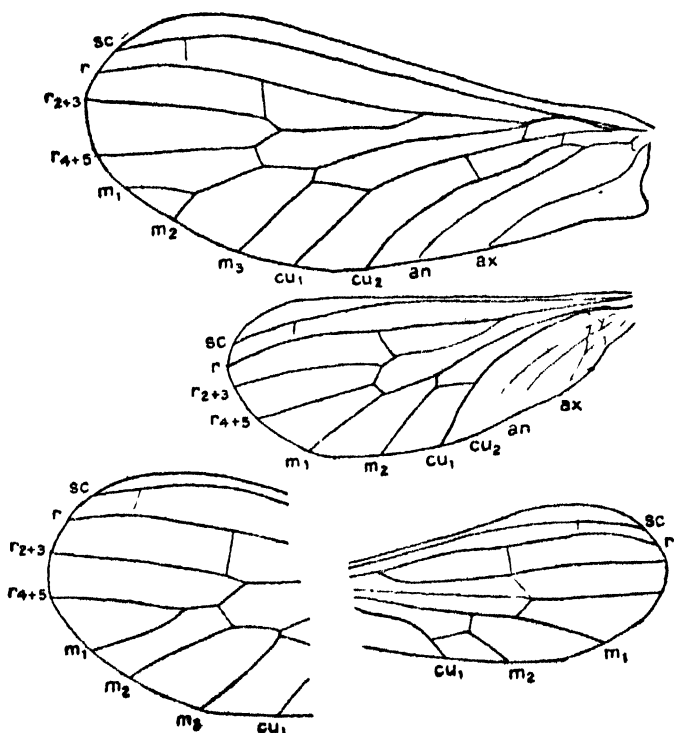
Maxillary (above) and labial palpus (beneath) of *Protosemidalis pluriramosa*, sp. n.

distal part. Maxillary palpi (fig. 1) long, all joints cylindrical, the four basal ones about equal in length, the fifth twice as long. Labial palpi (fig. 1) much shorter, the basal joints very short, almost triangular; apical joint very broad and long, cuneiform.

Prothorax very short and small. Mesothorax large and high, arched above. Metathorax practically of the same shape but somewhat smaller. Subcoxae large, distinct. Coxæ rounded, conical, large. Trochanters longer than wide, somewhat widened distally, at the end produced beneath into a blunt rounded angle. Femora and tibiae long, somewhat complanate; fore femora with several stronger spine-like bristles beneath. All tibiae set with short strong bristles

throughout their whole length, including some very strong ones arranged like a comb on the apical part of fore tibiae above. Tarsi 5-jointed; first joint longer than the four others together, cylindrical; third and fourth joints each shorter than the second, apical joint as long as the two pre-

Fig. 2.



Wings of *Protosemidahis pluriramosa*, sp. n. Above, normal fore and hind wing. Beneath: left, apical part of an anomalous fore wing in which m_1 is united with r_{4+5} ; right, a hind wing with a spurious vein connecting base of r_{4+5} with the wing-base.

ceding ones together; two slender, curved, acute apical claws.

Wings (fig. 2) of the usual form. Radial branch of fore wings always furcate. Fore branch of media again furcate before apex; in basal part of this fore branch (long before its

apical furcation) arises the cross-vein connecting with the hind branch of radial sector. In one fore wing of the three specimens before me a longitudinal vein from r_{4+5} branches off at a short distance behind this cross-vein, and the fore branch of m is here simple; that portion of the vein is therefore to be regarded as m_1 , here connected with r_{4+5} ; in all the other fore wings the fore branch of m is furcate. Cross-vein between m and cu oblique, arising always at the base of m_3 (as in *Semidalis*), never before the furcation (as in *Parasemidalis*). Radial branch and media in the hind wings always furcate. Sometimes from the base of r_{4+5} a spurious vein is emitted towards the base of hind wing, and, if the connection between r_{2+3} and r_{4+5} is less developed, then r_{4+5} seems to represent an independent longitudinal vein, arising from the base, whilst morphologically this basal part is to be regarded as a spuria. Media of hind wing not much more closely approximate to cubital than to radial vein. Veins of anal part somewhat indistinct.

Abdomen of usual shape. No ventral sacs visible. Gonopods of ♀ rounded. Ventral cone of ♂ triangular, set with a strong bristle. Lateral cone rounded. Sclerite of penis slender, S-shaped.

Protosemidalis pluriramosa, sp. n.

Three specimens from alcohol, now mounted in balsam; colour pale brownish yellow, thorax and head somewhat darker; antennæ, apical joints of palpi, and end of abdomen brown. Wings hyaline, the powder no longer distinguishable.

Length of body 2·3–2·6 mm.; of antennæ 1·4–1·6; of fore wings 2·3–2·4.

I received three specimens of this new insect from Egypt (Bsoef, 1. ix. 1921, *E. Hargreaves*) from the Imperial Bureau of Entomology. They were found on *Eucalyptus*, together with several specimens of *Retithrips ægyptiacus*.

This new species exhibits very remarkable venation in the fore wings, because the radial branch is furcate and the media divided into three branches (the fore branch of the chief fork being again furcate before the apex). As this arrangement of veins represents a character hitherto unknown amongst Coniopterygidæ, it has been necessary to erect a new genus for this Egyptian species. It seems to be of some phylogenetical interest, as we have in the two chief groups of Coniopterygidæ the following differences in venation:—The

Coniopteryginæ have a bifurcated radial branch and a bifurcated media, whilst in the Aleuropterygini the radial branch is simple and the medial vein 3-ramose. Enderlein is of the opinion that these branches are the same in both groups, the hind branch of the radial sector being united with the media in the Aleuropterygini. He has named the two branches of the radial sector in the Coniopteryginæ r_{2+3} and r_{4+5} , and the two branches of the media m_1 and m_2 . The radial sector of Aleuropterygini, therefore, is according to him r_{2+3} , whilst their medial vein should be regarded as $r_{4+5} + m_1 + m_2$. In *Protosemidalis*, however, we have now a furcate radial sector—i. e., r_{2+3} and r_{4+5} —and a 3-ramose media, so that its first joint cannot be r_{4+5} ! Thus, *Protosemidalis* seems to represent a type of venation more primitive than any of the other hitherto known types of Coniopterygidæ. Its radial sector consists, as in the Coniopteryginæ, of r_{2+3} and r_{4+5} ; but the media shows that Enderlein's m_1 was originally composed of two branches, which may be called m_1 and m_2 , and Enderlein's m_2 must then become m_3 . If this point of view is correct, it would be quite possible that the ancient type of Coniopteryginæ was very similar in venation to my *Protosemidalis*, and from this type may be derived both the Aleuropterygine and the Coniopterygine types. If in *Protosemidalis* m_1 becomes reduced, we get a simply furcate media as in Coniopteryginæ, its first branch (Enderlein's m_1) being m_{1+2} , its second m_3 . If the media remains as in *Protosemidalis*, but the hind branch of the radial sector becomes reduced, then we have the same type as in Aleuropterygini, the radial branch now being $r_{2+3+4+5}$, whilst the media remains $m_1 + m_2 + m_3$. If this interpretation of the veins is correct, it is clear that Enderlein's " r_{4+5} " is not the same vein in the Aleuropterygini and Coniopteryginæ, being m_1 in the former and only a branch of r in the latter.

From this point of view, *Protosemidalis* is the most primitive Coniopterygid hitherto known as to venation. It is, however, in some other points more specialized than the Aleuropterygini, as I cannot distinguish here any ventral sacs; and on this character my new genus must be placed in the Coniopteryginæ, in which, apart from the primitive 3-ramose media, it comes close to *Semidalis*. The cross-vein between the medial and cubital veins of the fore wings is at the same place as in this genus, viz., near the base of m_3 , a character separating both *Protosemidalis* and *Semidalis* from *Parasemidalis*, in which this cross-vein arises before the furcation of the media. In the Javanese *Parasemidalis decipiens*

described by Roepke (1916) this cross-vein also arises from m_3 , and this species has therefore nothing to do with *Parasemidalis*, Enderlein. It seems somewhat curious that Roepke has named his species "*Parasemidalis*," as this genus was erected eleven years ago and well defined by Enderlein, both in his monograph and in 'Genera Insectorum.' If Roepke's "*Parasemidalis*" proves to be really different from *Semidalis*, it must be given a new name, and I now propose *Metasemidalis* as a new name for *Parasemidalis*, Roepke (1916, type *decipiens*), nec Enderlein (1905, type *annæ*).

LVI.—*Hollow Curves*. By C. TATE REGAN, M.A., F.R.S.,
Keeper of Zoology in the British Museum (Natural History).

MY contribution to the debate at Hull in 1922 on the position of Darwinism, published in the Ann. & Mag. Nat. Hist. (ser. 9, vol. xii. 1923, p. 164), included a statement to the effect that curves were to be regarded only as graphic representations of certain facts, and that if one wanted to understand them further the only sound method was to study a large number of the variates, seeking for the causes of their frequency. The attempt to get out of curves more than has been put into them is a fascinating pastime, but does not produce results of scientific importance.

Wishing to understand Dr. Willis's "hollow curves," representing the frequency of genera of different sizes, and having had considerable experience of systematic work, I began to ask myself why I had made genera of various sizes, for genera represent the attempts of systematists to group species according to their relationships.

Approximately 20,000 living species of Teleostean fishes are known, belonging to about 330 different families; it will be seen that the average number of species in a family is about 60, but the families vary considerably in size, there being several with but a single species (e. g., Albulidæ, Chauidæ), whilst the largest (Cyprinidæ) has more than 1000: from this it results that in most families there is no room for genera of any great size. When attempting systematic revisions I have found that a number of genera—mostly small—may be said to define themselves, comprising isolated species or groups of species; more often the grouping of the species into genera is a difficult problem that involves

much study and consideration, with a result that leaves room for considerable difference of opinion.

In revising the Clupeidæ I came to the conclusion that Günther's conception of the large, varied, and cosmopolitan genus *Clupea* was unsuited to modern work on relationships and distribution, and I divided it into a number of genera that seemed to me to be natural. One of these was the genus *Alosa*; the reason it had 5 species and not 11 was that I gave only subspecific rank to 6 of the forms I defined, and the reasons it was not enlarged by the addition of a dozen species from the Black and Caspian Seas, separated from *Alosa* by a single character of doubtful validity, were that these were unquestionably a natural group, that their distribution helped to keep them apart, and that they had already received a generic name.

I found that monotypic genera were of many different kinds—some isolated, generalized, and presumably ancient types, others connecting-links between lower groups and higher, others species that differed from those of another genus in a single feature of specialization, generally adaptive, others "throw-outs" or "left-overs," that is, species omitted from larger genera in order to get precise definitions.

The general principles on which I worked were to group species into genera that were natural, definable, and not inconveniently large; usually, within the limits of a family, differences of somewhat the same kind and magnitude were, if possible, used to distinguish genera. Without going into further particulars, I may say that, having come to the conclusion that the causes that determined the sizes of genera were many and various, I felt that I was in a position to approach a mathematician with the suggestion that Dr. Willis's curves, if they meant anything, meant that on the whole systematists worked by similar methods.

On developing these ideas in conversation with Mr. H. G. Cannon, of the Imperial College of Science, he pointed out to me that in a family of 100 species the maximum possible number of monotypic genera was 100, of ditypic 50, of tritypic 33, etc., and that if this series 100, 50, 33, 25, 20, 16, 14, etc., down to 1 for genera of 51 to 100 species, was plotted, a curve resulted that had many points of resemblance to Dr. Willis's famous "hollow curve."

I interpret this to mean that in any large group of animals or plants, if the sizes of genera were purely a matter of chance, one would expect that a curve representing the frequency of genera of different sizes would approximate in form to the one just described. Actually, however, according

to Dr. Willis, we get a curve that is steeper at the beginning, the monotypic genera being three times, instead of twice, as numerous as the ditypic; also the tail of the curve is less regular, very large genera being few and scattered.

I conclude that the causes that determine the sizes of genera are sufficiently numerous and various to give an approximation to a chance effect, and that the nature of the material investigated (*e. g.*, including many families of small size and many isolated species) and the methods of systematic workers (*e. g.*, in splitting up genera that are inconveniently large and in throwing out species that make definitions difficult) may account for the divergence from the result to have been expected if chance alone had determined it.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

January 23rd, 1924.—Prof. A. C. Seward, Sc.D., F.R.S.,
President, in the Chair.

The following communication was read:—

‘On a Hybodont Shark (*Tristychius*) from the Calciferous Sandstone Series of Eskdale (Dumfries-shire).’ By Arthur Smith Woodward, LL.D., F.R.S., F.L.S., F.G.S.

The portions of Carboniferous Elasmobranchs hitherto studied seem to represent groups which are very different from those of the Mesozoic and Kainozoic Eras. A specimen of *Tristychius* in the Royal Scottish Museum, from the Calciferous Sandstone of Eskdale, more nearly conforms to the Mesozoic Hybodont type. It shows the head, abdominal region, pectoral fin, and dorsal fins. The cartilages are only superficially calcified in small tesserae. The teeth, of the form commonly named *Lophodus* Romanowsky, are arranged as in *Hybodus*, but in slightly more numerous transverse series. The notochord must have been persistent, and the short slender ribs are as in *Hybodus*. In the pectoral fin there are two basal cartilages, as in *Cestracion* and some other recent sharks; but there seems to be no extension of the fin-membrane beyond the radial cartilages. The specimen is unique, but apparently suffices to show that Elasmobranchs of nearly the modern type were beginning to arise in the Carboniferous Period.

THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY.
[NINTH SERIES.]

No. 77. MAY 1924.

LVII.—*Additional Species of Xylophilidæ from the Philippines, India, Fiji, and S. and W. Africa.* By G. C. CHAMPION, F.Z.S.

SINCE the publication of my last paper on Eastern Xylophilidæ in this Magazine (ser. 9, vol. v. pp. 393–406, May 1920) the British Museum has received a few additional species from the same regions, as well as several from Fiji, and S. and W. Africa; my eldest son, too, has sent others from Kuanaon, uniques in most cases, these having been kept back for two or three years in the hope of his obtaining more specimens, or at least the two sexes of some of them. The number of species of *Xylophilus* in the warmer parts of Asia and Africa seems to be endless, even islands like the Seychelles, Fiji, &c., having their endemic forms. Pic's Catalogue (1910) gives 336 species for the entire group, and since that date fully 300 species or varieties have been named or described, mostly by the same author, or by Lea, Escalera*, or myself. Probably half of the exotic forms are based on single examples; but as the ♂♂ seem to be commoner than the ♀♀ this does not greatly matter, the ♂-characters (unlike those of most of the Anthicoids) being often of a remarkable nature, more pronounced perhaps than in any genus of beetles known to me.

* The five preoccupied specific names used by this author for African insects have been changed by Pic (*Mélanges exot.-entom.* xxxvii. p. 21, Nov. 1922).

Jacobson (Coleopt. of Russia and Western Europe, p. 1018, 1915) adopts the generic name *Aderus*, Westw., in place of *Xylophilus*, Latr., and *Hylophilus*, Berth., both of which are preoccupied in Zoology.

HYLOBÆNUS, Pic.

1. *Hylobænus quadripustulatus*, sp. n.

♂. Elongate, narrow, robust, shining, finely pubescent; head (eyes excepted) and prothorax rufo-testaceous, antennæ black, with joints 1, 2, and 11 ferruginous, elytra, and the rest of the surface (the reddish terminal dorsal segment excepted) black, the elytra each with two large, rounded, yellow spots on the disc (one before the middle, the other near the apex), the legs (the posterior femora and tibiæ in part excepted) testaceous. Head large, subtriangular, feebly punctured; eyes extremely large, subcontiguous, deeply emarginate, occupying the whole of the sides of the head; antennæ long, very stout, joint 3 twice as long as 2, 4-8 a little shorter than 3, 9 and 10 transverse, 11 ovate. Prothorax convex, as long as broad, narrower than the head, narrowed towards base and apex, very finely punctured, almost unimpressed. Elytra much broader than the prothorax, long, gradually narrowed from the base, transversely depressed below the somewhat tumid basal portion, blunt at the tip; rather strongly punctured. Legs long, the intermediate pair especially elongated; posterior femora clavate, simple; posterior tibiæ feebly, sinuously bowed, becoming a little narrower towards the tip.

Length $2\frac{1}{2}$ mm.

Hab. PHILIPPINE Is., Dapitan, Mindanao (C. F. Baker: No. 6072).

One specimen. Easily recognized amongst its few known allies by the shining black, 4-spotted elytra, the very stout, long antennæ, &c. One species of *Hylobænus* was recorded by me from the Philippines in 1920, the present insect having been received subsequently from Mr. Baker. *Hylobænus gibbiventris*, Champ. (1920), type taken at Singapore, is also not unlike the present species, the two genera being connected by intermediate forms.

XYLOPHILUS, Latr. (HYLOPHILUS, Berth.).

1. *Xylophilus scindentatus*, sp. n.

♂. Elongate, robust, rather narrow, clothed with very fine sericeous pubescence, opaque, the elytra somewhat

shining; ferruginous, the eyes black, the palpi and tarsi in part testaceous; the head and prothorax densely, very finely, rugulosely, the elytra a little more diffusely, punctured. Head transverse, not wider than the prothorax, narrowly extended on each side behind the eyes, the latter large; antennæ comparatively stout, barely as long as the elytra. Prothorax subquadrate, as long as broad, rather convex, unimpressed, narrowed anteriorly. Elytra elongate, much wider than the head or prothorax, subparallel at the base, somewhat produced at the apex, unimpressed. Legs stout; femora subequally thickened, the posterior pair subangulate at a little beyond the middle beneath, the intermediate pair armed with an acute oblique tooth at the apex inferiorly; anterior tibiæ with a sharp triangular tooth at the middle and a small tooth at the tip within, the space between the teeth hollowed.

Length $2\frac{1}{2}$ mm.

Hab. INDIA, Chipurupalle, Vizagapatam, Madras (*R. S. Patuck*).

One ♂. Near *X. dentatifemur*, Pic, type ♂, from Ceylon, the head smaller and less convex, the antennæ shorter, the elytra unimpressed below the base. *X. armipes*, Fairm., types from Belgaum, a ♂ of which is to be found in the British Museum, is a larger and more robust insect, with longer and stouter antennæ, a broader head, &c. *X. patucki*, ♂, from the same locality in Madras*, has shorter elytra, much longer antennæ, a broader, laterally-subdentate head, and the median tooth on the anterior tibiæ wanting.

2. *Xylophilus patucki*, sp. n.

♂. Moderately elongate, clothed with fine sericeous pubescence, opaque, the elytra slightly shining; ferruginous, the palpi and tarsi testaceous or rufo-testaceous, the eyes and a large elongate patch on the disc of each elytron beyond the middle (extending to the suture but not reaching the outer margin) black, the posterior femora piceous in their outer half; the head and prothorax densely, very finely, rugulosely, the elytra more diffusely, punctured. Head transverse, broader than the prothorax, narrowly extended and angulate on each side behind the very large, coarsely-faceted eyes; antennæ moderately stout, extremely elongate, nearly as long as the body, joints 7-10 gradually decreasing in length. Prothorax subquadrate, rather convex,

* A ♂ of *X. uncifer*, Champ. (1916), has also been received from Chipurupalle.

as long as broad, narrowed anteriorly, unimpressed. Elytra wider than the head, rather long, subparallel in their basal half. Legs elongate; femora subequally thickened, the intermediate pair armed with an acute oblique tooth at the apex beneath, the posterior pair subangulate at a little beyond the middle inferiorly; anterior tibiæ compressed, somewhat sinuate within, and armed with a small tooth at the inner apical angle, the other tibiæ straight; anterior tarsal joint 1 as long as 2 and 3 united, slightly thickened.

Length $2\frac{1}{6}$ mm.

Hab. INDIA, Chipurupalle, Vizagapatam, Madras (*R. S. Patuck*).

One ♂, sent to the British Museum in 1923. Near *X. sellatus*, Champ. (1916), type ♂, from the Nilgiris, the black elytral markings not forming a definite fascia; the head less convex, angulate on each side behind the eyes; the antennæ much more elongate and stouter; the prothorax relatively broader, the femoral tooth sharper.

3. *Xylophilus luteitarsis*, sp. n.

♂. Elongate, somewhat shining, very finely cinereo-pubescent; black, the tip of the antennæ reddish, the femora and tibiæ nigro-piceous, the palpi and tarsi testaceous; closely, very finely punctured, the punctures on the elytra becoming a little coarser at the base, the interspaces alutaceous. Head broad, transverse, convex, narrowly extended on each side behind the eyes, the latter very large and coarsely faceted; antennæ long, rather stout, joints 4-10 elongate-triangular, 11 sharply acuminate. Prothorax as long as broad, subcylindrical, rather narrow, unimpressed. Elytra long, much wider than the head, obliquely depressed below the base. Legs elongate, slender; femora moderately thickened, the posterior pair subangulate towards the apex beneath; anterior tibiæ toothed at inner apical angle; anterior tarsal joint 1 nearly as long as the others united, somewhat thickened; intermediate tibiæ toothed at apex beneath.

Length 2 mm.

Hab. INDIA, Ranikhet in Kumaon [type] (*H. G. C.*), Rungbong Valley, Gopaldhara, Sikkim (*H. Stevens*).

Three ♂♂. Near *X. palliditarsis*, Pic, from Ceylon, the elytra black; the ♂ with the head simply convex (the transverse, fasciculate cavity, and the two tubercles behind it, wanting), the antennæ shorter, the prothorax narrower and less elongate, the anterior tibiæ toothed at the inner apical angle. *X. plumbeus*, Champ., type ♀, from Kanara, is

larger, and has the elytra more strongly punctured on the basal half, the prothorax broader, and the legs not so slender.

4. *Xylophilus seminiger*, sp. n.

♂. Elongate, shining, the elytra duller, clothed with fine pruinose pubescence; nigro-piceous, the head and prothorax rufous, the antennal joint 1 and 11 at the tip, palpi, coxæ, bases of femora, and tarsi in great part, testaceous or rufo-testaceous; the head sparsely, the prothorax and elytra closely, finely punctate, the interspaces on the latter alutaceous. Head transverse, convex, broader than the prothorax, rounded on each side behind the eyes, the latter very large; antennæ rather stout, long, thickened towards the apex, joints 4-10 triangular, 9 longer than broad, 10 shorter than 9, 11 stout, obliquely acuminate. Prothorax subquadrate, obliquely narrowed anteriorly, slightly broader than long; transversely sulcate across the middle, and with a small, deep U-shaped depression on the disc before the base. Elytra elongate, flattened, nearly twice the width of the prothorax, narrowed from the middle onward, obliquely depressed on the disc anteriorly. Legs elongate; anterior tibiæ slightly curved, sharply angulate at the apex within; anterior tarsal joint 1 stout, subcylindrical, longer than 2 and 3 united; posterior femora moderately thickened, grooved and closely, shortly flavo-ciliate beneath; posterior tarsal joint 1 curved, very elongate, more than twice the length of 2-4 united.

Length $2\frac{1}{2}$ mm.

Hab. INDIA, Haldwani, Kumaon (H. G. C.: ♂), ? Nilgiri Hills (*ex coll. Andrewes*: ♀).

One ♂. The elongate shape and long limbs give this insect the general *facies* of an *Anthicus*. A ♀ (now without head) from the Nilgiris from the Andrewes Collection may belong to the same species. Near *X. planipennis*, Motsch., from Ceylon.

5. *Xylophilus trapeziderus*, sp. n.

♂. Elongate, moderately shining, finely pubescent; brownish-testaceous (the eyes excepted), the palpi and tarsi testaceous, the abdomen infusate; closely, very finely, the elytra more strongly punctured. Head transverse, not broader than the prothorax, rather broadly extended on each side behind the eyes, the latter moderately large; antennæ rather long, slightly thickened outwards, joints 7-10 subtriangular, 11 acuminate-ovate. Prothorax transverse,

trapezoidal, angulate at the sides anteriorly, and obliquely narrowed thence to the apex; with an arcuate depression in the centre behind and a deeper oblique groove at the sides, the lateral grooves connected across the middle of the disc. Elytra much wider than the prothorax, subparallel in their basal half, obliquely depressed below the base. Legs long; anterior tibiæ with a sharp tooth beyond the middle within; anterior tarsal joint 1 rather stout; posterior femora moderately thickened, with a closely-packed row of short ochreous cilia along the lower edge.

Length $2\frac{1}{4}$ mm.

Hab. INDIA, Ranikhet, Kumaon (H. G. C.).

One ♂. Near *X. strangulatus*, Champ. (1920), from Borneo, and *X. barbicornis*, Champ. (1916), from the Nilgiris, differing from both of them in the sharply toothed anterior tibiæ in ♂, as well as in the structure of the antennæ, &c. The species of this genus with a ciliate pad or brush beneath the posterior femora in ♂ appear to be numerous in India and the Malayan region.

6. *Xylophilus haldwaniæ*, sp. n.

♂. Smaller and less elongate than *X. trapeziderus*; testaceous (the eyes excepted), feebly shining, the puncturing of the head and prothorax very fine, that of the elytra much coarser; head less angulate at the sides behind the eyes; antennæ slender; prothorax narrower than the head, transversely quadrate, obliquely narrowed anteriorly, and dilated into a small tooth just behind this, the basal depression deep, arcuate, the oblique lateral grooves shallow; elytra less elongate, the oblique post-basal depression deep; anterior tibiæ unarmed; intermediate femora slightly thickened at tip; posterior femora ochreo-ciliate along the lower edge.

Length $1\frac{1}{2}$ mm.

Hab. INDIA, Haldwani, Kumaon (H. G. C.).

One ♂, as shown by the extruded penis-sheath.

7. *Xylophilus breviscopa*, sp. n.

♂. Very like *X. trapeziderus*, the head a little darker, more shining, and more sparsely punctured; the antennæ stouter, joints 9 and 10 transverse; the prothorax dilated into a rather stout blunt tooth on each side anteriorly, the transverse median sulcus deeper; the elytra broader, with the suture and outer margins slightly infuscate; the anterior tibiæ unarmed; the posterior femora rufo-piceous, with a less elongate ochreo-ciliate pad beneath.

♀. Antennæ shorter; prothorax with a shallow transverse groove, more closely punctured; posterior femora as in ♂.

Length $2\frac{1}{4}$ – $2\frac{1}{2}$ mm.

Hab. INDIA, Ranikhet, Kumaon (H. G. C.).

Two specimens, assumed to be ♂ and ♀, the latter having the ovipositor extruded. These insects, at first sight, might be taken for ♀ ♀ of *X. trapeziderus*, the type of which is a ♂ from the same locality; but this cannot be the case, the prothorax differing in shape. This is the first species of the genus seen by me with a femoral brush or pad in ♀.

8. *Xylophilus tetrastictus*, sp. n.

♀. Moderately elongate, robust, very shining, clothed with pallid decumbent pubescence; black, the elytra with a broad humeral patch (nearly reaching the suture) and a transverse fascia towards the apex (not quite reaching the suture or outer margin), the palpi at the base, and the apices of the tarsi, testaceous; the entire upper surface closely punctate, the punctures on the elytra much coarser than those on the head. Head transverse, about as wide as the prothorax, narrowly extended on each side behind the eyes, the latter large and deeply emarginate; antennæ moderately long, stout, joints 6–10 strongly transverse. Prothorax rather convex, subquadrate, narrowed anteriorly, obsoletely canaliculate on posterior portion of the disc. Elytra very much broader than the prothorax, with a deep oblique depression extending downward from the humeri, the juxta-scutellar space thus appearing convex. Legs stout; posterior femora clavate.

Length $2\frac{1}{2}$ mm.

Hab. INDIA, Sukhatal, Kumaon, alt. 8000 ft. (H. G. C.: v. 1920).

One ♀, in perfect condition. A robust, shining, coarsely-punctured, Anthiciform insect, black, with two sharply-defined, transverse, testaceous patches on each elytron, the antennæ stout, with joints 6–10 strongly transverse. It can be placed near *X. axillaris*, Champ., from Assam.

9. *Xylophilus melanostictus*, sp. n.

Robust, rather convex, shining, pubescent; nigro-piceous, the basal joints of the antennæ, legs (the outer halves of the femora excepted), and elytra (an elongate-oval patch on the disc of each beyond the middle—extending inward to the suture and connected externally with a smaller oblong

streak on the outer margin—and the apices, excepted) testaceous; the entire upper surface closely, moderately coarsely punctured. Head strongly transverse, large, wider than the prothorax, broadly extended outward on each side behind the eyes, the latter large; antennæ rather stout, thickened outwards, joints 8–10 transverse, 10 angulate within, 11 very stout. Prothorax subquadrate, rather convex, broader than long, obsoletely canaliculate down the middle. Elytra broad, rounded at the sides posteriorly. Legs stout, the posterior pair with the femora clavate and the tibiæ widened.

Length $2\frac{1}{2}$ mm. (♀?)

Hab. INDIA, W. Almora Division of Kumaon (H. G. C.: viii. 1917).

One specimen, somewhat immature, a longitudinal depression in the dark dorsal patch on each elytron being probably due to the imperfectly-hardened integument. A shining, robust, coarsely-punctured insect, with maculate elytra, a very broad head, and a peculiarly-formed tenth antennal joint. The elytra are broader and more convex than in *X. himalaicus*, Champ., from the same region. *X. harmandi*, Pic* (1921), from Darjeeling, may be an allied, immaculate, nigro-piceous form.

10. *Xylophilus kumaonæ*, sp. n.

♂. Moderately elongate, rather broad, shining, finely sericeo-pubescent; black, the head (eyes excepted), antennæ, palpi, prothorax, a large humeral spot on each elytron and a faint transverse suffusion near the tip, and legs (the posterior femora and apices of posterior tarsi excepted) testaceous or rufo-testaceous; densely, finely, the elytra more strongly, punctured. Head transverse, narrowly extended for some distance on each side behind the eyes, appearing obliquely narrowed posteriorly as seen from above, the eyes very large; antennæ long, rather stout, thickened outwards, joints 7–10 triangular, about as long as broad, 11 sharply acuminate. Prothorax a little narrower than the head, transverse, narrowed anteriorly, almost unimpressed. Elytra broad, rather elongate. Legs long, simple, the posterior femora moderately thickened.

Length $2\frac{1}{2}$ mm.

Hab. INDIA, Haldwani Division of Kumaon (H. G. C.).

One ♂. Near *X. trinotatus* †, Champ. (1916), from

* Nec *Xylophilus harmandi*, Pic, Bull. Mus. Paris, 1910, p. 23, from Japan.

† This name has been used by Pic in 1921 for a variety of his *H. superbus*.

Tenasserim, type ♀; the head and prothorax rufo-testaceous, the elytra with a testaceous humeral spot and a very faint transverse suffusion before the tip, the legs quite simple, the posterior femora infusate.

11. *Xylophilus latidens*, sp. n.

♂. Short, robust, rather broad, shining, pubescent; testaceous (the eyes excepted), the elytra indeterminately infusate at the sides; the entire upper surface densely punctate, the punctures on the elytra coarse. Head broad, transverse, narrowly extended on each side behind the eyes, the latter very large and coarsely faceted; antennæ long, stout, joints 5-8 about as long as broad, 9 and 10 transverse, obliquely articulated, 11 nearly as long as 8-10 united, obliquely truncate at tip. Prothorax transverse, about as wide as the head, rounded at the sides anteriorly, almost unimpressed. Elytra short, wider than the head, narrowed from the middle. Legs long, rather stout; anterior tibiæ curved, mucronate at inner apical angle; anterior tarsal joint 1 curved, narrow; intermediate femora and tibiæ feebly curved, the femora clavate at apex; posterior femora curved, very stout, armed with a small sharp tooth at the tip, and also with a row of short hairs beneath; posterior tibiæ sharply, triangularly dilated externally at about one-third from the apex, the space between the tooth and the tip clothed with long hairs.

Length $1\frac{1}{2}$ mm.

Hab. INDIA, Haldwani Division of Kumaon (*H. G. C.*).

One ♂, somewhat crushed. The strongly pronounced ♂-characters readily distinguish this species, which is allied to *X. ceylonicus*, Pic, from Kandy, and *X. clavipes*, Champ., from Tenasserim; the ♂♂ of both these insects are known, and they each want the triangular ante-apical dilatation of the posterior tibiæ.

12. *Xylophilus basifasciatus*, sp. n.

♀. Moderately elongate, shining, finely pubescent; nigropiceous, the prothorax obscurely rufescent, the antennæ, palpi, legs, and the base of the elytra rather broadly, testaceous; densely, finely, the elytra a little more coarsely, punctured. Head strongly transverse, wider than the prothorax, very narrowly extended on each side behind the eyes, the latter large; antennæ rather short, not very slender, thickened outwards, joints 9 and 10 transverse. Prothorax convex, subquadrate, a little broader than long,

narrowed anteriorly, with a deep, uninterrupted, transverse groove before the base, the groove sharply defined and not reaching the outer margin. Elytra oblong, at the middle about twice the width of the prothorax, transversely depressed below the base. Legs rather short; posterior femora feebly clavate.

Length 2 mm.

Hab. INDIA, W. Bhatkot in Kumaon, alt. 4000 ft. (*H. G. C.* : v. 1920).

Two ♀ ♀. Not unlike *X. bryanti*, Pic, from Ceylon, but smaller and less robust, the legs shorter, slender, and entirely testaceous, the prothorax with a transverse basal sulcus, which is abruptly limited on each side, much as in certain species of *Atomaria*.

13. *Xylophilus subrufus*, sp. n.

♀. Moderately elongate, finely sericeo-pubescent, opaque, the elytra shining as seen denuded; obscure rufo-testaceous, the eyes black, the posterior femora in one specimen slightly infusate in their outer half; closely, very finely punctured, the punctures more distinct and more scattered upon the elytra. Head much broader than the prothorax, very narrowly extended on each side behind the eyes, and angulate externally as seen from above, the eyes large and coarsely faceted; antennæ rather long and slender, slightly thickened towards the tip, joints 8-10 longer than broad, 11 stout and obliquely acuminate. Prothorax subquadrate, nearly as long as broad, narrowed anteriorly, somewhat convex, unimpressed. Elytra twice as wide as the prothorax, feebly transversely depressed below the base. Legs long, the posterior femora moderately thickened.

Length 1½-2 mm.

Hob. INDIA, Chipurupalle, Vizagapatam, Madras (*R. S. Patuck*).

Four specimens, possibly including both sexes, one example (with imperfect antennæ) having a rather broader head than the others. Near *X. orientalis*, Champ. (1915), from Calcutta, &c., but readily separable therefrom by the laterally-angulate, narrow, post-ocular portion of the head. *X. rufinus*, Fairm., from Belgaum, must be another allied form.

14. *Xylophilus bifossulatus*, sp. n.

♀. Rather short, broad, shining, finely pubescent; piceous, the elytra brown; the basal joints of the antennæ, palpi, and bases of the tibiæ testaceous; the head and

prothorax very finely, the elytra closely, conspicuously punctured. Head transverse, rather broadly extended on each side behind the eyes, the latter comparatively small, entire; antennæ rather short, slender, thickened outwards, joint 10 broader than long, 11 stout, acuminate-ovate. Prothorax small, narrower than the head, transversely subquadrate, narrowed in front; with two deep oblique foveæ at the base, in front of which is a transverse groove. Elytra twice the width of the prothorax, widest behind the middle, convex, transversely depressed below the base. Legs slender, long, the posterior femora a little stouter than the others.

Length 2 mm.

Hab. INDIA, Gopaldhara, Rungbong Valley, Sikkim (*H. Stevens*).

One ♀. This insect has a small, deeply bifoveate prothorax, relatively very broad elytra, and slender limbs. The only described Indian species that appear to come near to it are *X. (Olotelus) rosti* and *X. (O.) brunneomaculatus*, Pic, both of which are larger forms with maculate elytra; specimens of the latter have been recorded by me from Almora, etc. *X. corticarioides*, Champ., from Panama, is a very similar insect.

15. *Xylophilus luzonensis*, sp. n.

♂. Oblong, robust, shining, clothed with long, pallid pubescence, testaceous, the eyes black; densely, the elytra more coarsely, punctured. Head broad, very narrowly extended on each side behind the eyes, the latter large, the latero-posterior angles rounded; antennæ moderately long, stout, joints 6–10 transverse, 11 stout, obliquely acuminate. Prothorax rather convex, transversely subquadrate, narrower than the head, obsoletely bi-impressed at the base. Elytra oblong, wider than the head, subparallel in their basal half. Legs rather stout; posterior femora curved, clavate, subangulate towards the apex beneath; anterior tibiæ feebly curved, armed with a small tooth at the inner apical angle.

♀. Antennæ slightly shorter; posterior femora not so stout; anterior tibiæ simple; elytra broader and less parallel.

Length $1\frac{1}{2}$ mm.

Hab. PHILIPPINES, Mt. Makiling, Luzon (*Baker*).

One pair. Very near *X. immaculipennis* (*immaculatus*, olim), Champ. (1915), type from Borneo, the antennæ more elongate in both sexes, the elytra a little longer, the ♂ with

the anterior tibiæ differently shaped and the posterior femora subangulate beneath.

16. *Xylophilus labasæ*, sp. n.

♂. Short, broad, very shining, sparsely cinereo-pubescent, nigro-piceous, the anterior portion of the head, palpi, terminal joint of antennæ, anterior legs, intermediate and posterior tarsi, and the apices of the corresponding tibiæ, testaceous, the antennal joints 1 and 2 obscure testaceous; the head sparsely, the prothorax closely, strongly, and the basal portion of the elytra rather coarsely punctured, the apical portion of the latter sparsely, finely punctate. Head broad; eyes large, occupying the whole of the sides of the head; antennæ short, rather slender, joints 8-10 about as broad as long, 11 ovate, stout. Prothorax small, convex, transverse, narrowed anteriorly, bifoveate at the base and shallowly, transversely grooved across the middle. Elytra short, broad, somewhat rounded at the sides, strongly transversely depressed below the base. Legs rather short, comparatively stout, the posterior femora moderately thickened, the anterior tarsal joint 1 oblong, widened, as broad as the tibia.

Length $1\frac{1}{4}$ mm.

Hab. FIJI ISLS., Labasa (*R. Veitch*: ix. 1922).

One ♂. A very small, short, shining, pitchy-black insect, with the front legs entirely, the intermediate and posterior tarsi, and the eleventh antennal joint testaceous, the head and elytra broad, the latter coarsely punctured anteriorly. The elytra are much broader and the legs stouter than in the W. African *X. pumilio* (infra), the puncturing in both of them becoming much finer towards the apex.

17. *Xylophilus rufiventris*, sp. n.

♂. Oblong, convex, opaque (till denuded), glauco-pruinose, clothed with extremely fine whitish pubescence; nigro-piceous above, obscure ferruginous beneath, the antennæ, palpi, and legs (the intermediate and posterior femora excepted) testaceous; the entire upper surface closely, very finely punctured. Head broad, rather convex; eyes large, occupying the whole of the sides of the head; antennæ long, slender, slightly thickened outwards. Prothorax convex, broader than long, much narrower than the head, unimpressed. Elytra wider than the head, somewhat rounded at the sides, transversely depressed below the base. Legs rather short, the posterior femora slightly thickened.

Length $1\frac{1}{4}$ – $1\frac{1}{2}$ mm.

Hab. FIJI ISLS., Labasa (*R. Veitch*: xii. 1921, ix. 1922).

Described from a specimen (δ ?) with a very broad head and partly infusate femora. A second example with a smaller head, and the legs, antennæ, and under surface wholly testaceous, seems to be a ♀ of the same species. A very small, convex insect, with the body nigro-piceous and pruinose above and reddish beneath. An isolated form.

18. *Xylophilus fujianus*, sp. n.

δ . Short, opaque (till denuded), finely sericeo-pubescent; ferruginous, the elytra brownish-testaceous, with a common, arcuate, black postmedian fascia extending forwards along the latero-inferior margins to the base, the antennæ black, with joints 1, 2, and the tip of 11 testaceous, the legs entirely testaceous; closely, finely, the elytra more distinctly punctate. Head broad, strongly transverse, angulate at the sides posteriorly as seen from above; eyes extremely large, narrowly separated, occupying the whole of the sides of the head; antennæ moderately long, rather stout, joints 7–10 transverse, 11 ovate, stout. Prothorax convex, narrow, transverse, much narrowed anteriorly, deeply obliquely bifoveate at the base, the space between the foveæ appearing tuberculiform. Elytra oblong, much wider than the head, comparatively short, obliquely depressed below the base. Legs rather stout, the posterior femora moderately thickened; anterior tarsal joint 1 oblong, very stout, broader than the tibia.

Length $1\frac{1}{2}$ mm.

Hab. FIJI ISLS., Labasa (*R. Veitch*: vii. 1922).

One δ . Not unlike a very small *X. populneus*, Creutz. The common arcuate black fascia on the elytra extends forwards laterally to the base. The basal joint of the anterior tarsi is much widened, as in the same sex of *X. accrensis* (infra), *X. nilyiriensis*, *X. bulbifer*, and several other species of the genus.

19. *Xylophilus flexipes*, sp. n.

δ . Moderately elongate, robust, clothed with rather long pallid pubescence; testaceous, the head nigro-piceous, opaque, densely, very finely punctured, the prothorax and elytra shining, closely punctate, the elytra strongly so. Head very broad, convex, subangulate at the sides inferiorly; eyes extremely large, occupying the whole of the sides of the head, rather narrowly separated above; antennæ long, stout

throughout, joints 8-10 transverse, 11 much thickened, hollowed and obliquely acuminate at tip. Prothorax short, convex, transversely subquadrate, unimpressed, narrower than the head. Elytra rather broad, oblong, narrowed from the middle. Anterior tibiæ compressed, curved, sinuate within, subdentate at inner apical angle; intermediate femora hollowed in their outer half beneath; intermediate tibiæ stout, compressed, curved externally, strongly bisinuate within; posterior femora much thickened, curved, flavo-ciliate beneath, and armed with a short tooth near the tip.

Length $1\frac{1}{2}$ mm.

Hab. W. AFRICA, Accra, Gold Coast (*Dr. J. W. Scott Macfie*: xi. 1920, v. 1921).

Two ♂♂, found in the Bungalow or Laboratory. A robust, shining, testaceous, pubescent insect, with a large, opaque, blackish head, stout antennæ, very large eyes, and strongly pronounced ♂-characters. The intermediate tibiæ are shaped much as in the Bornean *X. inæquipes*, Champ., and a few other species of the genus; but in the present insect this development is extended to the anterior pair also. *X. sulcatulus*, Pic (1894), from Addah, Guinea, may be based on a ♀ of this species; but, as it is said to have gradually thickened antennæ and very slightly thickened posterior femora, the identification is too uncertain to be adopted.

20. *Xylophilus ruficeps*.

? *Hylophilus versabilis*, var. *ruficeps*, Pic, L'Echange, xix. p. 181 [♀] (1903).

♂. Oblong, somewhat robust, shining, pubescent; rufo-testaceous, the eyes and extreme bases of posterior femora black; densely, finely, the elytra more distinctly, punctured. Head transverse, about as wide as the prothorax, rather broadly extended on each side behind the eyes, the latter small; antennæ moderately long, stout, joints 2 and 3 short, 3-11 stouter, 9 and 10 transverse, 11 oval. Prothorax strongly transverse, trapezoidal, toothed at the anterior angles, with a shallow arcuate depression before the base. Elytra short, much wider than the prothorax, slightly flattened below the base. Legs slender; anterior tibiæ curved, sinuate within, toothed at inner apical angle; posterior femora clavate, simple.

♀. Antennæ a little shorter; elytra broader, more rounded at sides; anterior tibiæ simple.

Length $1\frac{1}{2}$ - $3\frac{1}{2}$ mm. (♂ ♀.)

Hab. S. AFRICA, Weenen, Natal (*H. P. Thomasset* : ix. 1923: ♂ ♀), Frere, Natal (*Dr. Marshall* : ♀), Cape Colony (*type of Pic* : ♀?).

Four ♂♂ and three ♀♀ of this insect were captured at Weenen. It is separable from *X. versabilis*, Pic (1902), from Rhodesia, by the reddish head, and the much shorter antennæ and curved anterior tibiæ of ♂. The locality "Natal" for *X. versabilis*, added by Pic in his Catalogue (1910), probably refers to this species. The descriptions of the two insects are totally inadequate. *X. ovalis*, Champ. (1916), from Rhodesia, is a larger, broader insect, with still shorter antennæ in ♀ and entirely pale posterior femora.

21. *Xylophilus thomasseti*, sp. n.

Short, rather broad, somewhat convex, opaque, the elytra shining when denuded, clothed with fine cinereous pubescence; obscure ferruginous, the eyes black, the antennæ, palpi, and legs (the slightly infuscate posterior femora excepted) testaceous; the elytra with a large, indeterminate, common patch at about the middle and a space at the sides opposite to this infuscate, for the rest testaceous; densely, very finely, the elytra more distinctly, punctured. Head (with the eyes) not wider than the prothorax, subtriangular; eyes large, occupying the whole of the sides of the head; antennæ short, slender, thickened towards the tip, joints 1, 2, and 8-11 stouter than the rest, 3 short, 10 about as broad as long, 11 acuminate-ovate. Prothorax transversely subquadrate, rather convex, with a shallow, transverse, sinuous groove before the base formed by four confluent foveæ. Elytra oblong, broad, slightly rounded at the sides, transversely depressed below the base. Legs short, slender, the posterior femora stouter than the others.

Length $1\frac{3}{4}$ mm. (♀?)

Hab. S. AFRICA, Weenen, Natal (*Thomasset* : xii. 1923).

One specimen, in perfect condition. A small, rather convex, broad, partly testaceous form, with slender, apically-thickened antennæ, and short legs. Smaller, narrower, and darker than *X. ovalis*, Champ. (1916), from Rhodesia, the antennæ slender, the head smaller and with the eyes extending backward to the base.

22. *Xylophilus accrensis*, sp. n.

♂. Oblong, shining, finely sericeo-pubescent; testaceous,

the eyes black, the suture rather broadly infusate to about the middle, the antennæ slightly darker at the tip; densely, very finely, the elytra more distinctly punctate. Head about as wide as the prothorax, narrowly extended on each side behind the eyes, the latter rather small, entire; antennæ slender, moderately long, slightly thickened outwards, joints 1 and 2 stout, 9 and 10 about as long as broad, 11 stout, obliquely acuminate. Prothorax transverse, convex, trapezoidal, angulate at the sides anteriorly, with a shallow arcuate depression before the base. Elytra short, much wider than the prothorax, rapidly narrowed from about the middle. Legs slender; anterior tarsal joint 1 much widened, oblong; posterior femora moderately thickened, simple.

♀. Head a little smaller; antennæ much shorter; anterior tarsal joint 1 shorter, slender; posterior femora not so stout.

Length $1\frac{1}{4}$ – $1\frac{1}{2}$ mm.

Hab. W. AFRICA, Accra, Gold Coast (*Dr. J. W. Scott Macfie*: v.–vii. 1921).

One ♂, two ♀ ♀, found in the Bungalow or Laboratory at Accra by Dr. Macfie, and presented to the Museum by the Imperial Bureau of Entomology. A minute, sericeo-pubescent, testaceous insect, with the basal half of the elytral suture rather broadly infusate, the basal joint of the anterior tarsi greatly dilated in ♂. Near the Indian *X. denticollis* and *X. nilgiriensis*, Champ. (1916). *X. macularis* and *X. sulcatulus*, Pic (1894), from Addah, Guinea, must be very different from the present species.

23. *Xylophilus capensis*, sp. n.

♂. Oblong, shining, finely pubescent; testaceous, the head (the labrum excepted) black, the antennæ (joints 1–3 and 11 excepted) and posterior femora (except at base) piceous; closely, very finely, the elytra more strongly, punctured. Head large, broad, rounded at the sides posteriorly; eyes extremely large, occupying the whole of the sides of the head, coarsely faceted, almost contiguous above; antennæ long, joints 2 and 3 very small, short, 4–11 stout, broad, 4–10 subtriangular, about as broad as long, 11 acuminate. Prothorax small, transversely subquadrate, abruptly narrowed in front, feebly transversely depressed before the base. Elytra oblong, about twice the width of the prothorax, rounded at the sides posteriorly, obliquely

depressed below the base. Legs slender, simple, the posterior femora stout, clavate.

Length $1\frac{1}{2}$ mm.

Hab. S. AFRICA, Mossel Bay, Cape Province (*R. E. Turner*: ii. 1922).

One ♂. A very small form, not unlike *X. populneus*, Creutz., with extremely large eyes, a black head, very stout, long antennæ, joints 2 and 3 of which are quite small, and simply clavate posterior femora. *X. capensis* cannot be compared with the South African *X. femoratus*, Fairm. (1897), or *X. (Olotelus) apicalis*, Pic (1905).

24. *Xylophilus scriptioides*, sp. n.

Oblong, somewhat robust, shining, clothed with rather long, pallid pubescence; testaceous, the head only black; head sparsely, the prothorax and elytra closely, punctured, the punctures on the latter rather coarse. Head broader than the prothorax; eyes very large, occupying the whole of the sides of the head; antennæ rather stout, moderately long, joints 6–10 transverse, 11 acuminate-ovate. Prothorax convex, short, transversely subquadrate, distinctly widened at the base, almost unimpressed. Elytra oblong, much wider than the head, subparallel in their basal half. Legs rather stout, the posterior femora thickened.

Length $1\frac{1}{2}$ mm. (♀?)

Hab. S. AFRICA, Salisbury, Rhodesia (*Dr. Marshall*).

A single example, overlooked till now amongst Dr. Marshall's captures. A small, somewhat robust, pubescent, testaceous form resembling the Malayan *X. immaculipennis* and *X. luzonensis*, Champ., but with a black head. It has the general appearance of a small robust *Scriptia*.

25. *Xylophilus pumilio*, sp. n.

Oblong, narrow, shining, pubescent; obscure testaceous, the head reddish, the antennæ (joints 1–4 and 11 excepted) black; very finely, the elytra sparsely, rather coarsely punctured, the latter becoming smoother towards the apex. Head transverse, convex, much wider than the prothorax; eyes rather large, distant, feebly emarginate, occupying the whole of the sides of the head; antennæ short, slender, gradually thickened outwards, joints 5–10 somewhat moniliform, 8–10 transverse, 11 stout, ovate. Prothorax broader than long, narrow, convex, rounded at the sides anteriorly,

transversely grooved posteriorly and shallowly so across the middle. Elytra oblong-oval, much wider than the prothorax, depressed below the base. Legs slender, rather short, the posterior femora slightly stouter than the others.

Length $1\frac{1}{4}$ mm. (♀?)

Hab. W. AFRICA, Koforidud Bungalow, Gold Coast (Dr. J. F. Corson: 4. iv. 1921).

One specimen. A very minute form resembling a small *Melanophthalma*, with short, slender, partly black antennæ, the outer joints of which are submoniliform and the apical one ovate, the elytra strongly punctured at the base and much smoother at the apex. The Australian *X. (Syzetoninus) inconspicuus*, Blackb., is another minute insect of this kind.

26. *Xylophilus angulatipes*.

♂. *Xylophilus angulatipes*, Pic, Bull. Mus. Paris, xxvi. p. 500 (1920).

♂. Moderately elongate, rather convex, subcylindrical, feebly shining, closely pubescent; piceous, the mouth-parts, palpi, antennæ, and legs (posterior femora excepted) testaceous; densely, finely, the elytra coarsely punctate. Head as wide as the prothorax, transverse, subtriangular, narrowly extended on each side behind the eyes, the latter small, entire, and rather prominent; antennæ moderately long, slender, thickened outwards, joints 8-10 about as broad as long, 11 stout, ovate. Prothorax transverse, subquadrate, rounded at the sides anteriorly, obsolete bi-impressed at the base. Elytra wider than the prothorax, parallel, bluntly rounded at tip. Legs slender; posterior femora strongly clavate, finely flavo-ciliate along the lower edge; posterior tibiæ dilated at the apex externally into a large triangular plate.

Length $1\frac{1}{4}$ mm.

Hab. S. AFRICA, Mossel Bay, Cape Province (*R. E. Turner*: ii. 1922), Steynsburg, Cape Colony (*type of Pic*).

Two ♂♂ agreeing with Pic's description. This peculiar little insect has the general facies of an elongate *Corticaria*. It approaches the Australian section *Syzetonellus* of Blackburn, and should perhaps be removed from *Xylophilus*, which has already been broken up into numerous sections or so-called genera by Casey and other writers. A similar angular dilatation of the ♂ posterior tibiæ is to be found amongst various eastern species of the genus. *X. longipennis*, Pic (1895), from the same region, is said to be an allied insect.

Alphabetical numbered list of species enumerated or described as new in the present paper, all referred to Xylophilus unless otherwise stated; those marked with an asterisk are treated as new.

- | | |
|---|---|
| *accrensis, 22, <i>W. Africa.</i> | *melanostictus, 9, <i>India.</i> |
| angulatis, Pic, 26, <i>Cape Colony.</i> | *patucki, 2, <i>India.</i> |
| *basifasciatus, 12, <i>India.</i> | *pumilio, 25, <i>W. Africa.</i> |
| *bifossulatus, 14, " | *quadripustulatus (<i>Hylobænus</i>), |
| *breviscopia, 7, " | 1, <i>Philippines.</i> |
| *capensis, 23, <i>Cape Colony.</i> | rusiceps, Pic, 20, <i>Natal, etc.</i> |
| *fijianus, 18, <i>Fiji.</i> | *rufiventris, 17, <i>Fiji.</i> |
| *flexipes, 19, <i>W. Africa.</i> | *scraptioides, 24, <i>Rhodesia.</i> |
| *haldwanæ, 6, <i>India.</i> | *seminiger, 4, <i>India.</i> |
| *kumaonæ, 10, " | *sexdentatus, 1, " |
| *labasæ, 16, <i>Fiji.</i> | *subrufus, 13, " |
| *latidens, 11, <i>India.</i> | *tetrastictus, 8, " |
| *luteitarsis, 3, " | *thomasseti, 21, <i>Natal.</i> |
| *luzonensis, 15, <i>Philippines.</i> | *trapeziderus, 5, <i>India.</i> |

LVIII.—*New or little-known Tipulidæ (Diptera).—XXII. Australasian Species.* By CHARLES P. ALEXANDER, Ph.D., F.E.S., Amherst, Massachusetts, U.S.A.

THE material upon which the present report is based was received from the following sources:—New Zealand, through the kind interest of the collectors, Messrs. Campbell, Hamilton Harris, Morris, and Myers; New South Wales, through Dr. Ferguson and Mr. Robinson; and Victoria, received from the National Museum at Melbourne, through the kindness of the Provisional Director, Mr. Kershaw, and the Entomologist, Mr. Gerald F. Hill. I express my deepest thanks to all of the above-named gentlemen for their co-operation in this matter. The types are preserved in the collection of the writer, except where noted to the contrary.

DICRANOMYIA, Stephens.

ZELANDOGLOCHINA, subgen. nov.

Characters as in *Dicranomyia*, s. s., with the following exceptions:—Rostrum more or less elongate, in some cases longer than the remainder of the head; labial palpi elongate, divergent; palpi relatively elongate, 4-segmented. Antennæ with the flagellar segments produced apically into a slender glabrous pedicel, longer in the males, where the basal enlargement is more or less produced laterally, giving to the

antennæ a moniliform to short-pectinate appearance; all verticils of the flagellar segments borne on the basal swellings. In the females, the terminal pedicels are shorter and the moniliform appearance less marked. Legs, especially the tibiæ, with delicate appressed setæ and scattered elongate, conspicuous, suberect, spinous setæ, on the tibiæ more numerous in a row down the outer face.

Type of the subgenus, *Dicranomyia huttoni*, Edwards (Maorian Subregion).

The known species that are referable to this subgenus are all from New Zealand. Besides the type of the subgenus, the following species are included:—*D. atrovittata*, Alexander; *canterburiana*, Alexander; *circularis*, Alexander; *crassipes*, Edwards; *cubitalis*, Edwards; *decincta*, Edwards; *flavidipennis*, Edwards; *harrisi*, Alexander; *laterospina*, Alexander; *melanogramma*, Edwards; *myersi*, sp. n.; *octava*, Edwards; *paradisea*, Alexander; *sublacteata*, Edwards; *unicornis*, Alexander; and *unijuga*, Alexander.

Edwards states that one additional Australian species belongs here, but the writer cannot confirm this statement from any material that has come to hand. The first mention of a species of this subgenus was by Osten-Sacken (Berlin. Ent. Zeitschr. xxxi. p. 172, 1887) under the naked name of *D. monilicornis*. Hutton misinterpreted Osten-Sacken's conception of the group, and described a member of this subgenus as a species of *Geranomyia*. The group is nearly as well-defined as other Limoniine genera, as *Libnotes*, *Peripheroptera*, *Rhipidia*, and others, but it seems best to treat it as one of the rather numerous subgeneric concepts of the great genus *Dicranomyia*, which, in turn, is becoming increasingly difficult to separate from *Limonia*, Meigen.

Dicranomyia (Zelandoglochina) myersi, sp. n.

General coloration brownish yellow, the præscutum with three ill-defined dark brown stripes; pleura yellow, with a conspicuous black longitudinal dorsal stripe; wings pale yellow, the stigma barely indicated; proximal ends of cells R_3 and 1st M_2 lying far proximad of cell R_5 ; abdominal tergites largely black, the caudal margins of the subterminal segments narrowly yellowish.

Female.—Length 7.5 mm.; wing 7.6 mm.

Rostrum and palpi brownish black, the former, excluding the mouth-parts, a little shorter than the head. Antennæ with the scapal segments dark brown; flagellum dark

brown, the proximal ends of the basal segments indistinctly paler. Head grey, the narrow anterior vertex more pollinose.

Pronotum brown, the lateral margins blackened. Mesonotum obscure brownish yellow, the præscutum with three rather ill-defined dark brown stripes, the median one not attaining the suture, the anterior ends of the lateral stripes touching the median stripe; scutal lobes dark brown, the median area paler; scutellum and postnotum brown, sparsely pruinose. Pleura yellow, with a broad black longitudinal stripe, extending from the propleura across the anepisternum, pteropleurite, and postnotal pleurotergite to the base of the abdomen, surrounding the base of the halter. Halteres brown, the knobs more infuscated. Legs with the coxæ and trochanters yellow; femora obscure yellow, each with a narrow and relatively indistinct brown ring more than its length before the tip; tibiæ and tarsi brownish yellow, the terminal tarsal segments passing into brown. Wings with a pale yellowish tinge, the stigma scarcely darker; veins black, *C*, *Sc*, *R*, and *Cu* conspicuously paler. Macrotrichiae of veins relatively short. Venation: *Sc* short, *Sc*₁ ending just beyond the origin of *Rs*, *Sc*₂ a corresponding distance before this origin; *Rs* nearly straight, with a very short basal angulation; *r* rather long, feebly arcuated, in one wing of the type with several macrotrichiae on the cephalic end, the tip of vein *R*₁ beyond it short and semi-atrophied; inner ends of cells *R*₂ and 1st *M*₂ in approximate alignment and lying far before that of cell *R*₆, *r-m* lying beyond mid-length of cell 1st *M*₂; basal deflection of *Cu*₁ a short distance beyond the fork of *M*.

Abdomen with the basal tergites obscure brownish yellow, broadly margined laterally with brownish black; intermediate segments black, the caudal margins narrowly but conspicuously yellowish; sternites uniformly pale yellow. Ovipositor with the short tergal valves reddish horn-coloured, the bases of all the valves narrowly blackened.

Hab. New Zealand (North Island).

Holotype, ♀, Kaitia, North Auckland, September 20, 1923 (*J. G. Myers*).

This interesting crane-fly is named in honour of the collector, Mr. John G. Myers. It seems to be most closely allied to *D. (Z.) melanogramma*, Edwards.

Molophilus pæcilonota, sp. n.

General coloration light yellow; mesonotal præscutum

with three brown spots; each scutal lobe with a brown marking; two confluent brown spots at caudal margin of postnotal mediotergite; a conspicuous black spot on pteropleurite; knobs of halteres brownish black; wings yellow with two pale grey cross-bands.

Male and Female.—Length about 3.5 mm.; wing 4 mm.

Rostrum yellow, the palpi conspicuously dark brown. Antennæ of moderate length only, the basal segments light yellow, the flagellar segments more testaceous brown; flagellar segments oval, with erect white setæ. Head pale yellow.

Mesonotal præscutum yellow with three orange stripes, the cephalic ends of which are conspicuously dark brown, giving the appearance of three subcircular brown spots; scutum yellow, the lobes orange, the lateral angle of each with a triangular brown spot; scutellum light brown, the margin more testaceous; mediotergite of postnotum yellow, the caudal margin with two circular dark brown spots that are confluent. Pleura yellow, the dorsal portion of the pteropleurite with a large and very conspicuous black spot that is nearly circular in outline. Halteres yellow, the knobs brownish black. Legs with the coxæ and trochanters yellowish white; remainder of the legs yellow, the terminal tarsal segments passing into dark brown. Wings yellow with two broad, interrupted, very pale grey cross-bands, the first at the level of *Rs* and along vein 1st *A*, the second extending almost across the wing immediately beyond the cord; veins yellow, scarcely darker in the grey areas, the macrotrichia of the grey areas darker. Venation: 2nd *A* extending to just beyond the distal end of the basal deflection of *Cu*₁.

Abdomen yellow. Male hypopygium with the apices of the basistyles produced into a compressed, feebly chitinated blade, the apex suddenly narrowed into a beak. Outer dististyle bifid at apex; basal dististyle with the slightly enlarged base pale, the long apex slender, gradually narrowed to the acute apex which is directed mesad, before this long tip and near mid-length of the style on the lateral face with a few acute teeth, the distal ones larger.

Hab. New South Wales.

Holotype, ♂, Rous, Richmond River, August 23, 1923 (V. J. Robinson).

Allotopotype, ♀.

Austrolimnobia victoriae, sp. n.

General coloration yellow or orange; base of halteres yellow; wings whitish subhyaline, variegated with brown and yellow, cells *C* and *Sc* entirely dark brown; abdomen yellow, the segments ringed caudally with dark brown.

Male.—Length 15 mm.; wing 16.5 mm.

Rostrum brown, the palpi bright reddish brown. Antennæ approximated basally, the rather short basal segment reddish brown; second segment small; basal six flagellar segments yellowish, the seventh darkened; segments beyond the seventh broken; all flagellar segments elongate-cylindrical, with a series of unilaterally arranged bristles along outer face and with two smaller setæ on inner face at tip. Eyes very large, contiguous dorsally or approximately so, the restricted posterior vertex dark brown, brightening on the occiput.

Mesonotum reddish orange, the lateral margins of the scutal lobes above the wing-root with a velvety-black spot. Pleura obscure orange, the dorso-pleural region, the anepisternum, and postnotal pleurotergite infuscated. Halteres dark brown, the base of the stem narrowly yellowish. Legs with the fore coxæ and trochanters reddish brown, the middle and posterior coxæ and trochanters dark brown; femora yellow, the tips rather broadly (2.4 mm.) black; tibiæ yellow, the bases narrowly, the tips a little more extensively blackened; tarsi brownish yellow, gradually deepening to brown. Wings whitish subhyaline, with a handsome brown and yellow pattern, somewhat as in the genotype (*spectabilis*, Alexander), differing as follows:—Cells *C* and *Sc* entirely and uniformly dark brown, sending very small areas over the arculus and origin of *Rs*, and larger seams across the fork of *Rs* and fork of *R₂₊₃*, the yellow stigmal spot enclosed in the latter small and sub-circular; brown apex a little broader; brown washes along the caudal margin of wing more even, the outermost, on *Cu₂*, connecting with the seam on the basal deflection of *Cu₁*, those at the tips of the anal veins not extensive and broadly connected with one another, in cell 2nd *A* extending to the anal angle; veins pale, dark brown in the infuscated areas. Venation: *r* scarcely more than its length from the tip of *R₁*; inner end of cell *R₂* lying proximad of cell 1st *M₂*, which, in turn, lies a corresponding distance proximad of cell *Cu₁*; *m* longer than the outer deflection of *M₂*; basal

deflection of Cu_1 about two-thirds its length beyond the fork of M .

Abdomen yellow, the caudal margins of the segments rather narrowly but conspicuously dark brown; lateral margins of the segments, especially the sternites, narrowly dark brown; hypopygium dark brown, the tergite a little paler medially at the base.

Hab. Victoria.

Holotype, ♂, Dandenong Range.

Type in the collection of the National Museum, Melbourne.

HORISTOMYIA, gen. nov.

Rostrum short; palpi small. Antennæ 16-segmented, the second scapal segment large; flagellar segments all distinct, oval, with moderately long verticils. Thorax without tuberculate pits; pseudosutural foveæ relatively small, semicircular, black. Tibiæ without spurs but with spinous setæ, with similar setæ at the apices of the tarsal segments; claws small, smooth; empodia present. Wings with Sc long, Sc_1 ending beyond the fork of Rs , Sc_2 not far from its tip, Sc_1 about twice Sc_2 ; Rs arcuated; cell R_2 shorter than its petiole; r lacking; basal deflection of R_{4+5} very short to obsolete; cell 1st M_2 long, the basal deflection of Cu_1 not far from mid-length of this cell; cell M_1 lacking; anterior arculus broken. Male hypopygium of a peculiarly primitive nature; basistyles with the mesal face produced into a flattened lobe; dististyle single, a simple curved arm that is borne on the mesal face of the basistyle just beyond mid-length, the margin with conspicuous spines, at the slightly dilated apex with a group of small spines and a row of about six longer spinous setæ. Gonapophyses and ædeagus very conspicuous, strongly decurved, the elements of approximately equal length; ædeagus split at apex into two divergent arms that are expanded into spatulate blades at tips; gonapophyses gradually narrowed into acute spines, subtending the ædeagus, before the tip of each with a high spinous crest.

Genotype, *Gonomyia leucophæa*, Skuse (Australian Sub-region).

The very curious and isolated fly that is made the type of the above new group is but distantly related to *Gonomyia*, to which genus it was referred by Skuse. The tibial spurs are not evident, yet the fly has a very *Limnophila*-like appearance. The fly may be regarded as being Eriopterine until more evidence to the contrary is forthcoming.

Polymoria pristina, sp. n.

General coloration reddish brown, the præscutum dark brown with lateral yellowish stripes; femora yellowish with a narrow dark brown subterminal ring; wing brownish yellow, the centre of the disc more hyaline, the surface of the wing with a heavy brown-spotted pattern.

Female.—Length about 16 mm.; wing 16.4 mm.

Rostrum and palpi dark brown. Antennæ with the scapal segment dark brown, paler dorsally; second segment brown, paler apically; flagellar segments 1 and 2 black, narrowly yellow at both ends, the remainder of the organ broken; the flagellar segments that remain are cylindrical and of such a length as to indicate a rather long antenna. Head blackened, pruinose, the occipital region paler.

Pronotum reddish brown, the sides darker brown. Mesonotal præscutum dark brown, with three stripes, a broad median brownish vitta, narrowly margined by the ground-colour, and obscure yellow lateral stripes that cross the suture on to the scutal lobes; scutum pale medially, the mesal margins of the lobes greyish brown, the lateral margins narrowly dark brown; scutellum light brown, the caudal margin with two dark brown spots; postnotum largely dark brown. Pleura obscure yellow with a broad dorsal infuscation; sternopleurite ventrally similarly darkened. Halteres elongate, obscure yellow, the knobs infuscated. Legs with the coxæ brownish yellow, the bases more or less infuscated; trochanters obscure yellow; femora brownish yellow; the apices broadly more whitish, including a narrow dark brown subterminal ring at a little less than its length from the tip; tibiæ obscure yellow, the tips narrowly dark brown; tarsi passing into brown. Wings brownish yellow, more nearly hyaline or whitish hyaline in the centre of the disc, the surface with a heavy brown pattern including conspicuous paler brown seams at arculus; origin of R_s ; at stigma, continued across the fork of R_{2+3} and at tips of veins R_1 and R_2 ; the veins in these darkened areas are largely yellow, producing a peculiar ocellate appearance; solid darker brown seams and spots along the cord, outer end of cell 1st M_2 , fork of M_{1+2} , and marginal spots at ends of all the longitudinal veins, smallest in the radial and medial fields, becoming successively larger in the cubital and anal fields, the basal two-thirds of cell 2nd A likewise solidly dark brown; cells R_3 , R_5 , M_1 , 2nd M_2 , M_3 , Cu_1 , Cu , and 1st A with linear dusky washes in the centres of the cells; veins dark brown, yellowish as indicated

above. Venation: Sc long, Sc_1 ending some distance beyond the fork of R_{2+3} , Sc_1 and Sc_2 subequal; R_s angulated and spurred at origin; R_{2+3} about equal to basal deflection of Cu_1 ; r about its length from the tip of R_1 ; inner ends of cells R_s , R_5 , and 1st M_2 in approximate alignment; petiole of cell M_1 about twice m ; basal deflection of Cu_1 long, sinuous, placed shortly beyond the fork of M ; anterior arculus lacking.

Abdomen greased, the tergites brown, paler basally and laterally; sternites largely yellowish.

Hab. Victoria.

Holotype, ♀, without exact data.

Type in the collection of the National Museum, Melbourne.

Polymoria electa, sp. n.

General coloration reddish brown; legs hairy, the segments tipped with darker; wings light yellow, the anal angle and a large area in the vicinity of the stigma infuscated; remainder of wing-disc with conspicuous brown markings; R_{2+3} and cell 1st M_2 long.

Female.—Length about 9.5 mm.; wing 10.4 mm.

Rostrum small, pale brown, the palpi dark brown. Antennæ small, pale brown; basal three flagellar segments enlarged, separated from one another only by indistinct sutures, especially the basal two; remaining flagellar segments cylindrical with conspicuous verticils that are a little longer than the segments. Head pale brown.

Mesonotum uniformly brown, without distinct markings. Pleura similar, but the pteropleurite and postnotal pleurotergite infuscated. Halteres rather short, pale, the knobs infuscated. Legs with the coxæ relatively elongate, pale brown; trochanters yellow; remainder of legs with the femora yellow, the tips rather broadly pale brown; tibiae yellow, the tips very narrowly darkened; basal three tarsal segments yellow, the tips very narrowly and indistinctly infuscated, the terminal two tarsal segments infuscated; segments of legs with conspicuous outspreading setæ. Wings light yellow, with a conspicuous brown pattern that is, in part, ocelliform; the cephalic outer portion of the wing surrounding the stigma extensively infuscated, this including cells R_1 , R_2 , and R_3 ; anal angle of wing in cells 1st A and 2nd A likewise extensively infuscated; the ocelliform markings include a very large one at the origin of R_s , this being the only darkening that extends into cells C and Sc ; other circles along the cord, outer end of cell 1st M_2 ,

the fork of M_{1+2} and at the tips of veins M_1 , Cu_1 , Cu_2 , 1st A , and 2nd A , the last large and irregular; a small brown spot in cell R mid-distance between arculus and origin of Rs ; cells M , Cu , the caudal portion of R , and the basal half of 1st A and 2nd A with a pale brown wash; veins brown, more yellowish in the flavous areas. Venation: Sc_1 ending opposite the fork of Rs , Sc_2 a short distance from its tip; Rs long; R_{2+3} a little shorter than the very long narrow cell 1st M_2 ; r on R_2 about two and one-half times its length from the fork of R_{2+3} and about three and one-half times its length from the tip of R_1 ; veins R_2 and R_3 gently divergent; inner ends of cells R_3 , R_5 , and 1st M_2 in alignment; cell M_1 about equal in length to its petiole; basal deflection of Cu_1 near mid-length of cell 1st M_2 ; anterior arculus faintly indicated, pale, with a small dark spot immediately distad of it.

Abdomen light brown. Ovipositor with the elongate, almost straight valves horn-coloured.

Hab. New South Wales.

Holotype, ♀, Blue Mts., February 26, 1922 (*E. W. Ferguson*).

Type returned to Dr. Ferguson.

Limnophila luteicauda, sp. n.

Antennæ short; general coloration (in alcohol) dark brown; wings long and narrow, tinged with brown, the stigma a little darker brown; R_{2+3} and basal deflection of R_{4+5} subequal; basal deflection of Cu_1 not far beyond the inner end of cell 1st M_2 ; male hypopygium with the outer dististyle bearing a lateral spine before the apex.

Male.—Length about 5.5 mm.; wing 6.2 mm.; its greatest width 1.45 mm.

Described from alcoholic specimens.

Rostrum and palpi dark brown. Antennæ short, dark brown throughout, the flagellar segments beyond the basal few oval. Head dark brown.

Pronotum and mesonotum uniformly dark brown, any bloom if normally present destroyed by immersion in alcohol. Pleura concolorous. Halteres relatively long and slender, pale, the knobs scarcely darker. Legs long and slender; coxæ and trochanters obscure yellow, the remainder of the legs dark brown, the femoral bases narrowly paler. Wings relatively long and narrow, as shown by the measurements, with a strong brownish tinge, the oval stigma still darker brown; veins dark brown. Venation: Sc_1 ending

just before the tip of the long, gently arcuated Rs , Sc_2 about twice its length from the tip; r faint, bisecting the stigma; R_{2+3} about equal to or a little longer than the basal deflection of R_{4+5} , in alignment with Rs ; veins R_2 and R_4 gently divergent; cell 1st M_2 small, rectangular, the basal deflection of Cu_1 not far from its proximal end; cell M_1 about two-thirds the length of its petiole; anterior arculus preserved.

Abdomen brown, the fourth to eighth segments somewhat darker, the basistyles of the hypopygium conspicuously light yellow. Male hypopygium with the basistyles elongate, narrowed toward the apex; outer dististyle slender, heavily chitinized throughout its length, gently curved, the apex terminating in a stout spine, before the tip on the outer face with a shorter and more slender spine; outer face on apical half with setigerous tubercles; inner style short and fleshy. Gonapophyses slender, the free end of each directed caudad as a slender sinuous rod that is pale horn-coloured. Aedeagus unusually long and stout for a member of this group.

Hab. New Zealand (South Island).

Holotype, ♂, Little River, Banks Peninsula, Canterbury, March 31, 1923 (*J. W. Campbell*).

Paratopotype, ♂.

Limnophila luteicauda is a member of the genus only in the broad sense. It belongs to the small aggregation of New Zealand species that resemble species of *Zelandomyia*, but differ therefrom in the details of venation and hypopygial structure.

Limnophila pauciseta, sp. n.

General coloration dark brown, sparsely pruinose; antennæ black throughout, the segments oval; wings tinged with brown, with slightly darker brown clouds along the cord and outer end of cell 1st M_2 ; stigma conspicuous, dark brown; a few macrotrichiae in outer ends of cells R_2 to 2nd M_2 ; cell M_1 lacking.

Male.—Length about 6.5 mm.; wing 7.5 mm.

Female.—Length about 9.5 mm.; wing 9.5 mm.

Rostrum and palpi brownish black. Antennæ of only moderate length, black throughout, the segments with a dense white pubescence, the verticils short; flagellar segments oval or with the ventral face a trifle more bulging than the dorsal face. Head dark brown, the vertex more yellowish in front, the posterior part of the head brownish pollinose.

Mesonotal præscutum with a yellowish pollen, with three distinct blackish stripes; pseudosutural foveæ distinct, but tuberculate pits lacking; scutum and scutellum yellowish brown, sparsely grey-pruinose, the centres of the scutal lobes infuscated; mediotergite of postnotum infuscated, sparsely pruinose, except laterally. Pleura dark brown, grey-pruinose. Halteres yellow, the knobs infuscated. Legs with the coxæ yellow, their outer faces more or less infuscated and sparsely pruinose, more evident on the fore coxæ; trochanters yellow; femora yellow, the tips infuscated, the middle femora more extensively so; tibiæ and tarsi dark brown; tibial spurs distinct. Wings tinged with brown; stigma conspicuous, oval, dark brown; brown washes along the cord and outer end of cell 1st M_2 ; anal angle a little infumed; veins dark brown. A few macrotrichia in the extreme outer ends of cells R_2 , R_3 , R_5 , and 2nd M_2 . Venation: Sc_1 ending opposite the fork of R_s , Sc_2 at its tip; R_s of moderate length, in alignment with R_{2+3} , the latter about one-third longer than the basal deflection of Cu_1 ; r on R_2 less than twice its length from the fork and a corresponding distance from the tip of R_1 ; inner ends of cells R_3 , R_5 , and 1st M_2 in alignment; cell M_1 lacking; basal deflection of Cu_1 from two-thirds to fully its length beyond the fork of M ; m shorter than the outer deflection of M_2 ; anterior arcus present.

Abdomen dark brown, the basal sternites with obscure yellow basal spots; hypopygium and ovipositor obscure brownish fulvous. Ovipositor with long slender valves, the tergal valves only slightly upcurved.

Hab. New South Wales.

Holotype, ♂, Blue Mts., April 2, 1922 (*E. W. Ferguson*).

Allotopotype, ♀.

Type returned to Dr. Ferguson.

Paralimnophila flammeola, sp. n.

Related to *P. aurantiipennis* (Alexander); antennæ longer, yellowish, the basal seven segments with conspicuous pectinations; mesonotal præscutum with four reddish-brown stripes; pleura orange, with a dorsal pale brown longitudinal stripe; legs obscure orange; wings broader, with sparse brown markings; Sc_1 longer than the distal section of R_{4+5} .

Female.—Length 20 mm.; wing 16.8 mm.

Rostrum reddish brown, the palpi darker brown with the basal segment a little paler. Antennæ with the scapal segments brownish yellow, the flagellum light yellow, only

the terminal segments passing into brown; antennæ 16-segmented, the basal seven flagellar segments with conspicuous terminal pectinations, the longest only a little shorter than the segments themselves. Head reddish brown, the centre of the vertex infuscated, pruinose.

Anterior pronotum fiery-orange, the posterior pronotum more whitish yellow. Mesonotal præscutum yellow, with four reddish-brown stripes, the intermediate pair only narrowly separated from one another, the anterior ends of the short lateral stripes confluent with the intermediate stripes, the usual interspaces thus reduced to narrow yellow lines before the suture; pseudosutural foveæ large, pale, the mesal ends a little darker; scutum and scutellum reddish brown; postnotal mediotergite obscure orange, each posterior lateral angle darker. Pleura orange, the dorso-pleural region narrowly yellowish, margined beneath by a narrow, brown, ill-defined, longitudinal stripe, extending from the propleura across the dorsal edge of the anepisternum, becoming obsolete at the wing-root. Halteres dark brown, the base of the stem yellow. Legs with the coxæ and trochanters light orange-yellow; remainder of legs obscure orange, the femora very indistinctly darker before the tips; apices of tibiæ and basal tarsal segments a little darker. Wings broader than in *P. aurantiipennis*, the cells correspondingly wider; cell *C* darker brown, paler distally; stigma oval, rather pale brown; brown clouds in base of cell *R* and at origin of *R*₅, the latter not passing into cell *Sc*; very restricted brown seams along the cord, outer end of cell 1st *M*, and at fork of *M*₁₊₂; paler brown washes beyond mid-length of veins 1st *A* and 2nd *A*; anal angle narrowly darkened; veins yellow, darker in the infuscated areas. Venation: *Sc*₁ longer than the distal section of *R*₁; *R*₂₊₃ one-third longer than the basal deflection of *R*₄₊₅; cell 1st *M*, much wider than in *aurantiipennis*.

Abdomen orange-yellow, the sternites clearer yellow. Ovipositor with the valves elongate, as in the genus.

Hab. Victoria.

Holotype, ♀, Ferntree Gully, April 16, 1922.

Type in the collection of the National Museum, Melbourne.

Paralimnophila puella, sp. n.

General coloration grey; femora pale brownish yellow, the tips darker brown; wings creamy-white; the base and cells *C* and *Sc* yellowish; a diffuse brown pattern, including a seam that completely traverses the wing at the cord.

Female.—Length 10·9 mm.; wing 9·4 mm.

Rostrum dark brown, grey-pruinose; palpi dark brown. Antennæ with the basal segment testaceous, the second segment yellow; flagellum yellowish brown, the outer segments darker, the inner face of the segments a little produced. Head grey, the anterior vertex and orbits lighter grey; centre of vertex with an indistinct longitudinal brown vitta.

Pronotum light grey. Mesonotal præscutum light grey with three brown stripes, the median one more or less divided; pseudosutural foveæ large and conspicuous, their mesal ends encroaching upon the lateral margins of the median stripe; scutum dark brown, the median area pruinose, the lobes apparently denuded in the unique type; scutellum and postnotum pruinose, the latter with a very delicate and indistinct median brown vitta. Pleura dark, heavily light grey-pruinose, the dorsal regions and sternopleura infuscated. Halteres obscure yellow, the knobs infuscated. Legs with the coxæ brownish testaceous, sparsely pruinose, the fore coxæ more darkened at bases; trochanters yellowish testaceous; femora pale brownish yellow, the tips broadly darker brown; tibiæ pale brown passing into darker brown beyond mid-length; basitarsi infuscated, the apical fourth whitish; tarsal segments 2 and 3 white, the tips faintly darkened; terminal tarsal segments infuscated. Wings creamy-white, the base and cells *C* and *Sc* more yellowish; stigma oval, dark brown; large, paler brown clouds as follows: in cell *R* at mid-distance between arculus and origin of *Rs*; at origin of *Rs*; along the cord and outer end of cell 1st *M*, the latter completely traversing the wing and suffusing most of cell *Cu*₁; a darker cloud at tip of vein *R*₂ and conspicuous pale clouds at the wing-tip; fork of *M*₁₊₂; ends of anal cells; near mid-length of cells *M* and *Cu* and along vein *M*, connecting the spot at origin of *Rs* with the seam along the cord; veins dark brown, paler in the subhyaline areas. Venation: *Sc*₁ ending just beyond the fork of *Rs*, *Sc*₂ some distance from its tip and covered by a small brown seam; *Rs* long, angulated at origin; in the right wing of the type with an adventitious cross-vein in the axil of the sector; *r* about twice its length from the tip of *R*₁ and about one and one-half times its length beyond the fork of *R*₁₊₂; cell *M*₁ shorter than its petiole; *m* short, the outer deflection of *M*₂ correspondingly lengthened; basal deflection of *Cu*₁ not far beyond the fork of *M*.

Abdominal tergites dark brown sternites obscure brownish

yellow, the segments margined laterally with dark grey. Ovipositor with the very long valves yellowish horn-colour, the tergal valves a little darker basally.

Hab. Victoria.

Holotype, ♀, Ferntree Gully, December 25, 1917.

Type in the collection of the National Museum, Melbourne.

Paralimnophila fraudulenta, sp. n.

General coloration light grey; antennæ with the ventral apical angle of the basal four flagellar segments very slightly produced; mesonotal præscutum with three dark brown stripes; legs dark brown, the intermediate tarsal segments yellowish white; wings long and narrow, whitish subhyaline, the base and costal region dark brown, the disk with a heavy brown pattern.

Female.—Length about 12.5 mm.; wing 9 mm., their greatest width 1.65 mm.

Rostrum light grey, the palpi short, dark brown. Antennæ dark brown, the basal segment heavily light grey-pruinose; only fourteen antennal segments present; basal four flagellar segments with the ventral face at apex a trifle produced; remaining segments elongate-oval, the three terminal segments short-oval. Head light grey, the centre of the very broad vertex restrictedly infuscated.

Pronotum grey, the scutellum more brownish. Mesonotal præscutum light grey with three conspicuous brown stripes, the broad median stripe further bisected by a capillary darker brown vitta; pseudosutural foveæ very conspicuous, transverse, black; remainder of mesonotum light grey, the scutal lobes and a narrow median line on scutum brown. Pleura light grey, the dorso-pleural region a little darker; meron with a dark spot behind mid-coxa. Halteres pale, the knobs dark brown. Legs with the coxæ pale, sparsely pruinose, the fore coxæ a little infuscated; trochanters yellow, the outer faces infuscated; femora and tibiæ dark brown, the fore femora narrowly paler at base; basitarsi dark brown, the tips narrowly whitish; tarsal segments 2 and 3 yellowish white, the terminal two segments infuscated; on the fore tarsi the tips of tarsal segments 1 to 3 are narrowly infuscated. Wings very long and narrow; whitish subhyaline, rather heavily variegated with brown, the wing-base and cells *C* and *Sc* dark brown; extensive brown clouds at origin of *Rs*; basad of last in *R*, at *r* (stigmal), and tip of *R*₂; less distinct clouds along the cord, outer end of cell 1st *M*₁ and along the wing-margin; veins dark brown.

Venation: R_{2+3} and basal deflection of R_{4+5} subequal; basal deflection of Cu_1 shortly beyond the fork of M ; cell 2nd A long and narrow.

Abdomen brown, the basal tergite and lateral margins of the other segments pruinose. Ovipositor with the tergal valves slender, upcurved, the base dark brown, the tips fading into horn-colour.

Hab. New South Wales.

Holotype, ♀, Blue Mts., April 1, 1922 (*E. W. Ferguson*).

Type returned to Dr. Ferguson.

Closely resembling *Cerozodia minuscula*, Alexander, differing chiefly in the feebly serrate antennal segments, involving only the basal four flagellar segments, and the narrow wings with a slightly different venation.

Gynoplistia patruelis, sp. n.

Head shiny black; antennæ of male 20-segmented, with fourteen branched segments; mesonotum metallic-green, microscopically striate; halteres yellow; legs black, the femoral bases narrowly fulvous; wings yellowish subhyaline, with a very sparse brown pattern; radial and medial veins beyond cord almost destitute of macrotrichia.

Male.—Length 15.5 mm.; wing 11.7 mm.

Female.—Length about 17.5 mm.; wing 13 mm.

Male. Rostrum shiny black, the mouth-parts and palpi dull black. Antennæ black throughout, 20-segmented, the formula being $2+2+12+4$, the third flagellar segment about mid-distance between the planes of the basal two and the succeeding branches; pectinations long, the longest (flagellar segment 7) approximately two-fifths the flagellum; branch of the fourteenth flagellar segment about as long as the segment; terminal segment about one-half longer than the penultimate. Head shiny coal-black.

Pronotum coal-black. Mesonotum metallic-green, the præscutum with a very weakly indicated median carina, the surface with microscopic, mostly transverse striæ, the interspaces smooth but with conspicuous setigerous punctures; scutum similarly striate, the posterior margins of the lobes more purplish, smooth, with setigerous punctures; mediotergite of postnotum with a basal central area provided with transverse striæ, the remainder with longitudinal striæ. Pleura dull with a heavy white microscopic pruinosity, this including the postnotal pleurotergite, which is dull with the exception of the extreme cephalic margin which is shiny metallic-blue. Halteres pale yellow throughout. Legs with

the coxæ dull, microscopically pubescent; trochanters black; remainder of the legs black, the femoral bases conspicuously fulvous, broadest on the fore legs where more than the basal third is included, narrowest on the posterior legs where only the narrow base is fulvous. Wings yellowish subhyaline, the extreme base and cell *C* more yellowish; cell *Sc*, except the base, infuscated; stigma small, oval, dark brown; a small, circular, brown cloud at origin of *Rs* and a seam along the anterior cord, extending from the stigma to *r-m*; posterior cord and outer end of cell 1st *M*₂ very faintly seamed with darker; a brown seam behind vein *Cu*; veins brownish black. Macrotrichia of veins very sparse, none on *Rs*, *R*₂₊₃, *R*₃, *M*₁₊₂, *M*₁, or *M*₂; on *R*₄₊₅ about thirteen along the distal three-fourths of the vein. Venation: *Sc*₁ ending opposite the fork of *R*₂₊₃, *Sc*₂ at its tip; *Rs* angulated and weakly spurred at origin; *R*₂₊₃ a little more than one-half the basal deflection of *R*₄₊₅; tip of *R*₁ beyond *r* faint; petiole of cell *M*₁ less than one-half of the cell; basal deflection of *Cu*₁ at about one-third the length of the cell.

Abdomen dull brownish black, the extreme lateral margins of the tergites indistinctly brightened; basal tergite more glabrous, the distal segments dull, with microscopic appressed yellow setæ; tergites with basal transverse impressed lines; hypopygium dark, the basistyles obscure reddish brown.

Female. Generally similar to the male. Antennæ with ten branched segments, the formula being 2+2+8+?, the terminal segments broken; branch of tenth flagellar segment minute. Spot at origin of *Rs* larger, subquadrate. Ovipositor with the valves of moderate length only.

Hab. New South Wales.

Holotype, ♂, Kosciusko, December 7, 1922 (*G. Goldfinch*).

Allotopotype, ♀.

Type returned to Dr. Ferguson.

The sculpturing of the thorax would indicate a relationship with *G. fergusoniana*, sp. n.; the trichiation of the wing-veins is much as in *G. vilis*, Walker.

Gynoplistia bella atripes, subsp. n.

Differs from typical *bella* in the uniformly black legs.

Female.—Length 18 mm.; wing 11 mm.

Rostrum and palpi black. Antennæ 18-segmented, the formula being 2+2+7+7, the branch of the ninth flagellar segment minute. Head shiny coal-black.

Pronotum and mesonotum shiny coal-black, the præscutum smooth. Pleura covered with a microscopic silvery

pubescence. Halteres entirely black. Legs with the coxæ black, greyish pruinose; remainder of legs entirely black. Wings with the base broadly orange; cell *C* paler than cell *Sc*; the quadrate dark area at origin of *Rs* not connected along *M* or *Cu* with the dark basal area or the seam along the cord; the darkened apex relatively narrow and pale, the subapical white band thus being very broad and complete. Venation: veins *R*₂ and *R*₃ divergent.

Abdomen with segments 1 and 6 to 9 black; segments 2 to 5 orange, ovipositor with the dorsal shield black, the valves horn-coloured.

Hab. New South Wales.

Holotype, ♀, Kosciusko, December 7, 1922 (*G. Goldfinch*).

Type returned to Dr. Ferguson.

The close relationship with *bella*, best expressed by a trinomial, is shown by the arrangement of the macrotrichiæ of the veins and the distribution of the microtrichiæ in the darkened areas of the wings. The arrangement of the trichiæ on the veins is as follows: None on *Rs*, *R*₂₊₃, *R*₂, *M*₁₊₂, or *M*₂; on *R*₃ about 9, on distal half; on *R*₄₊₅ about 24; on *M*₁ only 1 or 2. Microtrichiæ arranged in dense clusters of six or eight.

Gynoplistia bimaculata nigrotibialis, subsp. n.

Male.—Length about 8.5 mm.; wing 8.8 mm.

Generally similar to the typical form as described by Skuse, differing as follows:—

Antennæ 19-segmented, the formula being 2+2+10+5; terminal flagellar segment one-half longer than the penultimate, narrowed apically. Pleura with a silvery-grey microscopic pubescence. Halteres brown, the knobs brownish black. Legs with the trochanters black; femora black, the bases broadly fulvous, on the fore legs occupying almost the basal half of the segment; tibiæ and tarsi uniformly black. Wings whitish subhyaline, the base narrowly but conspicuously yellow; cells *C* and *Sc* uniformly dark brown, similar in intensity to the conspicuous spots at origin of *Rs* and on the anterior cord; wing-tip extensively clouded; a brown seam along vein *Cu* and less distinct washes in the anal cells. Short but numerous macrotrichiæ on the veins, as follows: 7 on distal third of *Rs*; 8 on *R*₂, 5 beyond *r*; about 37 on *R*₃, most of the distal ones paired; about 42 on *R*₄₊₅, a few of the distal ones paired; 2 on petiole of cell *M*₁; 18 on *M*₁; 2 on distal third of *M*₂. Abdomen with the basal segment black; hypopygium deep mahogany-brown,

the eighth tergite and caudal margin of the seventh black ; intermediate segments bright orange-fulvous.

Hab. New South Wales.

Holotype, ♂, Blue Mts., January 29, 1922 (*E. W. Ferguson*).

Type returned to Dr. Ferguson.

Gynoplistia fergusoniana, sp. n.

General coloration metallic-green ; antennæ 19-segmented in the ♂, 18-segmented in the ♀ ; femora fulvous, the tips broadly brownish black ; tibiæ dark brown, the posterior tibiæ with a very broad pale yellow ring before the tips ; wings topazine-yellow with a very sparse brown pattern ; abdomen with the basal segment blue-black, the remainder of the organ largely fulvous.

Male.—Length about 13 mm. ; wing 10·5 mm.

Female.—Length about 14·5 mm. ; wing 12·5 mm.

Rostrum short, black, with yellow setæ ; palpi dark brown. Antennæ 19-segmented, the formula in the ♂ 2+2+11+4, the branch of the thirteenth segment shorter than the segment ; longest branch approximately two-fifths the flagellum ; antennæ dark brown, the apices of the basal four flagellar segments paler. In the ♀ the antennæ are 18-segmented, the formula being 2+2+7+7, the branches long and conspicuous for this sex, the longest approximately three times the length of the segment that bears it. Head brilliantly shiny blue-black, with an orange spot immediately behind each antennal fossa, more conspicuous in the ♂ ; the low vertical tubercle is weakly bidentate.

Pronotum black, the scutellum shiny. Mesonotum metallic-green, the præscutum with a faintly indicated subglabrous median carina, the surface of the sclerite with transverse to oblique microscopic striæ, better indicated on the region occupied by the usual stripes ; scutal lobes with similar transverse and oblique striæ, the lateral region of each scutal lobe elevated into an obscure brown tubercle, the surface of this region with yellow setæ, the median area of the scutum with smaller but similar setæ ; scutellum black, the margin with yellow setæ ; postnotum greenish blue, the base with transverse striæ, the disk of the mediotergite with concentric, chiefly longitudinal striæ ; pleurotergite glabrous, with longitudinal striæ. Pleura black, the sclerites with a dense appressed silvery pruinosity, covering the proepisternum, the anepisternum and dorsal region of sternopleurite, the pteropleurite and the katepisternum.

Halteres brown, the knobs darker. Legs with the coxæ and trochanters black, the coxæ with a conspicuous white microscopic pruinosity; femora fulvous, the tips broadly brownish black, most conspicuous on the posterior legs where there is also an indication in the female of a medial brown ring; tibiæ dark brown, the posterior pair with a broad pale yellow ring immediately before the narrow dark tips, the ring occupying nearly two-fifths of the entire tibia; setæ and integument of this ring pale; tarsi black. Wings with a brownish-topazine tinge, the base and cell *C* clearer yellow; cell *Sc* infuscated, except at base; a tiny brown cloud at origin of *Rs*, a little larger in the ♀; stigma conspicuous, dark brown; a brown seam along vein *Cu* and a narrow seam along the basal deflection of R_{4+5} ; veins dark brown. Venation: *Rs* strongly angulated at origin; cell M_1 a little longer than its petiole; basal deflection of Cu_1 not far from the inner end of cell 1st M_2 , the distance about equal to $r-m$.

Abdomen with the basal segment violaceous blue-black, the remaining tergites fulvous, the hypopygium and tip of the eighth tergite black. In the female the subterminal segments with violaceous reflections.

Hab. New South Wales.

Holotype, ♂, Blue Mts., January 7, 1922 (*E. W. Ferguson*).

Allotopotype, ♀, March 4, 1922 (*E. W. Ferguson*).

This very interesting crane-fly is named in honour of the collector, Dr. Eustace W. Ferguson, to whom I am indebted for many favours. The type has been returned to Dr. Ferguson. *Gynoplistia fergusoniana* is apparently most nearly allied to the smaller *G. viridithorax*, Skuse.

Gynoplistia chalybeia evanescens, subsp. n.

Differs from typical *chalybeia*, Skuse, in the practical obliteration of the white ring on the posterior tibiæ.

Male.—Length about 5.2 mm.; wing 6.8 mm.

Very close to the typical form, differing as follows:—

Head metallic-green. Femoral bases yellow, on the posterior legs very broad, including more than the basal two-thirds; the usual pale ring on the posterior tibiæ is almost obliterated, being represented only by a very narrow, pale brown ring at this point. Venation: $r-m$ distinct, longer than R_{2+3} .

Hab. Tasmania.

Holotype, ♂, King Island (*Lea*).

Paratopotype, ♂.

Type in the collection of the South Australian Museum.

Typical *Gynoplistia chalybeia* varies much in the coloration of the abdomen, in some specimens segments 2 to 4 being reddish orange, in others the abdomen entirely steel-blue.

Gynoplistia hamiltoni, sp. n.

Male.—Length about 9 mm. ; wing 8.5 mm.

Described from an alcoholic specimen.

Very closely related to *G. violacea*, Edwards, from which it differs chiefly in antennal and hypopygial characters.

Antennæ 19-segmented, the formula being $2+2+11+4$; longest branch eight to nine times the length of the segment that bears it; branch of the fifteenth segment about one-half longer than the segment; four terminal segments distinct. Wings with a heavy brown pattern; cell *Sc* entirely dark brown; stigma dark brown, sending an extensive cloud along the cord to cell 1st M_2 ; a large cloud at origin of *Rs*, not quite reaching *M*; wing-apex extensively clouded with brown, including all of cell M_1 , this colour extending along the wing-margin to beyond vein 2nd *A*. Venation: no supernumerary cross-veins in any of the cells, those in *violacea* very probably adventitious rather than supernumerary; *r* very faint but located less than twice its length from the tip of R_1 , cell 2nd R_1 being very small; vein 2nd *A* not strongly curved at tip. Male hypopygium generally similar to that of *violacea*, but the gonapophyses entirely different from Edwards's description and figure; each appears as a transverse oval chitinized plate, at mid-length of the caudal margin produced into a slender, nearly straight apine; lateral end of the plate produced into a long, tail-like appendage that is finally directed mesad, the apex spear-like. The basal mesal face of the basistyle is setiferous and produced into a slender curved interbasal process, this directed mesad, caudad, and finally nearly laterad, the surface setiferous, the apex acute.

The coloration and bloom is largely removed by immersion in alcohol, but the mesonotum, as well as the abdomen, shows deep purplish blue; hypopygium pale brown. Fore coxæ pale apically, the others less extensively so.

Hab. New Zealand (South Island).

Holotype, ♂, Arthur's Pass, Canterbury, altitude 1500–3600 feet, December 1922 (*H. Hamilton*).

This crane-fly is named in honour of the collector, Mr. Harold Hamilton, to whom I am indebted for many interesting species from Arthur's Pass.

Gynoplistia vittinervis, sp. n.

Antennal flagellum and branches black; mesonotal præscutum shining black, the humeral region paler; femora with a pale subterminal ring; posterior tibiæ with a whitish ring near mid-length; wings yellow with a brown pattern that includes seams along the veins that produce a vittate appearance; R_{2+3} equal in length to the petiole of cell M_1 ; abdominal tergites yellowish brown, the lateral margins darker brown.

Male.—Length about 12 mm.; wing 11.5 mm.

Rostrum and palpi brown. Antennæ with at least fourteen branched segments, the terminal segments broken; scapal segments light brown, the flagellum and its branches black; flagellar branches long, including the basal two; the branch of the fourteenth segment is likewise long (about eight times the segment), which would indicate that there are still other branched segments beyond it. Head dark brownish grey.

Pronotum light brown. Mesonotal præscutum shiny black, the humeral region paler, with distinct pseudosutural foveæ; scutal lobes dark, the median area paler; scutellum and mediotergite of postnotum shiny brownish yellow. Pleura dark brown, the anepisternum and pteropleurite grey-dusted; pleurotergites brown, blackened above the base of halter. Halteres yellow, the knobs infuscated. Legs with the coxæ pale brown, sparsely pruinose; trochanters pale brown; only the posterior legs of the type remain; femora obscure yellow, at about one-third the length passing into brown, the tips rather broadly dark brown, preceded by a narrower but conspicuous pale yellow annulus; tibiæ yellowish brown, passing into brown, with a broad whitish ring near mid-length, the setæ of the segment uniformly dark; tibial spurs elongate; tarsi brownish black. Wings tinged with yellow; cells C and Sc more saturated; a rather extensive brown pattern that appears, in part, as seams along many of the longitudinal veins, especially those beyond the cord; besides these narrow seams there is a quadrate area at the origin of Rs ; the stigmal area; a broad cloud on the anterior cord; narrower seams along the posterior cord and outer end of cell 1st M_2 , and a cloud on vein 1st A beyond mid-length; apices of cells 1st A and 2nd A a little suffused; veins dark brown. Venation: Rs long, angulated at origin; R_{2+3} unusually long, about equal to the petiole of cell M_1 ; cell M_1 fully twice as long as its petiole; basal deflection of Cu_1 beyond mid-length of cell 1st M_2 ; vein 2nd A moderately sinuous.

Abdominal tergites light yellowish brown, the lateral margins darker brown; sternites brown, the median area still darker brown. Male hypopygium of approximately similar type to *G. tridactyla*, Edwards; tergite transverse, with a small lateral tooth on either side; apical process of basistyle broken near base and its length not known; mesal face of basistyle with conspicuous projections or lobes, one a chitinized beak-like blade with the margin weakly serrulate; the basal appendage (interbasal process) is a straight slender rod that terminates in a slightly bulbous pointed apex. Dististyles two, slender, the outer straight, the apex a little dilated into a truncated head; inner style a little shorter, the apex dilated and obliquely truncated, the face with microscopic setæ and a few large bristles, including a group of four near apex.

Hab. New Zealand (South Island).

Holotype, ♂, Takaka, Nelson, February 19, 1923 (C. B. Morris).

Ischnotoma goldfinchi, sp. n.

General coloration light grey and black; flagellar segments of male antennæ produced into flattened disks; legs black, the femoral bases narrowly fulvous; wings whitish grey, faintly clouded with darker grey; abdomen uniformly dark greyish brown.

Male.—Length 16 mm.; wing 17.5 mm.

Female.—Length about 19 mm.; wing 19 mm.

Frontal prolongation of head grey, the nasus elongate; palpi brownish black. Antennæ black throughout, the basal segment dusted with grey; antennæ of the male with the basal flagellar segment cylindrical, shorter than *I. par* (Walker); segment 2 with the lower face produced; segments 8 to 10 broad triangular, disk-shaped, the lateral angles conspicuous. Head dark brown, the anterior portion of the vertical tubercle obscure fulvous, the broad posterior orbits light grey.

Mesonotal præscutum light grey, with three darker grey stripes that are broadly and conspicuously margined with black, the broad median stripe split by an additional narrow black median line, the black margins of the lateral stripes confluent with the median stripe; scutum with the broad median area light grey, each lobe black with three dark grey spots, the mesal one largest; scutellum brownish black, the median area heavily light grey pruinose; postnotal mediotergite light grey with a median dark brown vitta, the lateral margins narrowly infuscated, and two circular darker grey

spots at caudal margin. Pleura light grey; a brown cloud surrounding the anterior spiracle; a second cloud on the anepisternum; pleurotergite black with a large, oval, light grey centre; mesosternum and meron darker ventrally. Halteres brownish testaceous, the knobs infuscated. Legs with the coxæ light grey; trochanters greyish black; remainder of the legs black, the femoral bases narrowly fulvous, broadest and most conspicuous on the posterior legs where about the basal third is involved. Wings with a pale whitish-grey tinge, the base conspicuously fulvous; cell *Sc* and the proximal half of the stigma brownish fulvous; stigma brown; veins indistinctly seamed with brown; pale brownish-grey clouds on the wing, more distinct at origin of *R*₅ and outer end of cell *C*, in centre of cell *R*₃; outer end of cell *R*₃ and all the posterior anal cells, leaving the bases of the cells of the ground-colour; basal cells grey, with a conspicuous oval area of the ground-colour at the outer end of cell *M*; veins dark brown, more yellowish in the fulvous areas. Venation: *R*₃ not so strongly arcuated as in *I. par*.

Abdomen uniformly dark greyish brown, the lateral margins of the tergites grey-pruinose, the basal tergite light grey with a conspicuous brown median oval; sternites similar. Male hypopygium with the caudal margin of the ninth tergite with a conspicuous U-shaped notch. Eighth sternite unarmed.

The female is similar to the male as described, but the flagellar segments are less distinctly disk-shaped though conspicuously produced.

Hab. New South Wales.

Holotype, ♂, Kosciusko, December 7, 1922 (*G. Goldfinch*).

Allotopotype, ♀.

This distinct species of *Ischnotoma* is named in honour of the collector, Mr. G. Goldfinch, to whom we are indebted for many fine Tipulidæ. The type has been returned to Dr. Ferguson.

Macromastix simillima, sp. n.

Male.—Length 7·8–8·5 mm.; wing 12·5–14·2 mm.; antenna 11–14 mm.

Belongs to the *binotata* group and closely related to *M. longioricornis*, Alexander, from which it differs chiefly in the shorter antennæ and the structure of the male hypopygium.

Antennæ approximately one-half longer than the body and shorter than the wing; flagellum testaceous, darkening into brown; flagellar segments gradually lengthening to

the fourth, thence shortening to the end of the organ. Mesonotal præscutum obscure ochreous, the interspaces darker, with four conspicuous dark brown stripes, the intermediate pair very narrowly separated by a capillary vitta, strongly narrowed behind, the two together appearing cuneiform; scutal lobes with dark centres; mediotergite of postnotum a little darkened posteriorly. Pleura pale brown, the dorsal pleurites a little infuscated. Legs brown, the tips of the femora a little darker, the tibial bases a little paler; terminal tarsal segments darker. Wings broader than in *longioricornis*; ground-colour pale salmon-colour, with a relatively heavy ocellate brown pattern; the dark area in the base of cells *R* and *M* is only narrowly separated from the large ocellate ring near mid-length of vein *M*; areas at origin of *Rs* and in the vicinity of the cord more clearly defined. Abdominal segments bicolorous, the bases of the tergites dark brown; a little more than the terminal half brownish ochreous, more extensive on the posterior segments; sternites more nearly uniform in colour; hypopygium brownish ochreous. Male hypopygium with the dististyle terminating in a blunt obtuse apex, the spines at base of style about five in number, becoming smaller distally. In *longioricornis* the dististyle is produced into a long tapering blade, the apex subacute.

Hab. New Zealand (North Island).

Holotype, ♂, Waiouru, Wellington, June 11, 1923 (*T. R. Harris*).

Paratopotypes, 13 ♂♂; *paratypes*, 1 ♂, Owango, July 1, 1922 (*T. R. Harris*); formerly included as a paratype of *M. longioricornis*; 1 ♂, Ohakune, August 10, 1922 (*T. R. Harris*); 1 ♂, Taumarunui, October 1, 1922 (*T. R. Harris*).

In the Taumarunui paratype the antennæ reach their maximum length, but are still shorter than the wing. The types were taken while crawling about over the ground and climbing fences.

Macromastix monstrata, sp. n.

General coloration dark brown; antennæ moderately elongate; mesonotal præscutum with three confluent brownish-ochreous stripes, the median one narrowed to a point in front; halteres elongate; wings semiatrophied, infuscated, with still darker markings; abdomen dark brown, tergites 5 and 6 with light grey posterior margins.

Female.—Length 6.5 mm.; wing 5.5 mm.

Frontal prolongation of the head relatively slender, dark

brown, nasus small ; palpi dark brown. Antennæ moderately elongate, if bent backward extending to mid-distance between the bases of the wings and halteres ; scapal segments pale brown, especially the second segment ; flagellum dark brown ; flagellar segments gradually decreasing in length outwardly. Head brown, a trifle paler adjoining the inner margin of the eyes.

Pronotum narrow, dark brown. Mesonotal præscutum depressed, flattened, dark brown, with three brownish-ochreous stripes, confluent behind, the median stripe narrowed to an acute point in front, the lateral stripes somewhat divergent ; scutal lobes brownish ochreous, the median area darker ; scutellum large, brownish ochreous ; postnotum dark brown. Pleura dark brown. Halteres elongate, the base of the stem and apices of the knobs abruptly pale. Legs relatively short, brown, the femoral tips darkened ; terminal tarsal segments dark brown. Wings semi-atrophied, the extreme base dark brown ; cells *C* and *Sc* for a distance beyond *h* darkened, almost to their outer ends ; base of vein *Cu* darkened, the remainder yellowish ; *Cu*₂ and deflection *Cu*₁ infuscated ; remainder of wing tinged with brown. Venation distorted, but otherwise distinct.

Abdomen dark brown, the second tergite with a transverse paler area beyond mid-length ; tergite 5 light grey, with a median anterior brown spot : tergite 6 with the caudal margin greyish ; tergite 7 with the posterior border a little paler than the base. Ovipositor with blunt valves.

Hab. New Zealand (North Island).

Holotype, ♀, Ohakune, altitude 2060 feet, July 17, 1923 (*T. R. Harris*).

This species would seem to find its nearest ally in *Macromastix cubitalis*, Edwards, which is fully winged in both sexes.

LIX.—*Descriptions and Records of Bees*.—XCIX.

By T. D. A. COCKERELL, University of Colorado.

THE Siberian bees recorded below are all from the Maritime Province, and were obtained during the summer of 1923.

Colioxys rufescens nigrescens, subsp. n.

♀.—Like *C. rufescens*, Lepel., from Europe, with the same tridentate last ventral segment, but apical part of last

dorsal shorter, and not evidently keeled; scutellum and top of head with dark (brownish-black) hair; the large punctures on disc of mesothorax not so dense.

Okeanskaja, Siberia, Aug. 18, 1 ♀ (*Cockerell*).

Cælioxya mandibularis olgæ, subsp. n.

♂.—Length slightly over 9 mm.

Like *C. mandibularis*, Nyl., of Europe, but more robust, face broader; long hair of face pale fulvous, of pleura not so clear white, of metathorax fulvous-tinted; axillar spines stouter and not so strongly curved; spines at sides of fifth abdominal segment longer; hind margins of ventral segments 2 to 4 black, quite simple. The fourth ventral is much more finely and closely punctured than those before. Hind spurs black.

Olgæ, Siberia, July 13, 1 ♂ (*W. P. Cockerell*).

Cælioxya kudiana, sp. n.

♂.—Length 9 mm.

Black, including mandibles, antennæ, tegulæ, and legs, but hind spurs pale ferruginous; pubescence white on face, cheeks, and pleura, fulvous on vertex, white tinged with fulvous on dorsum of thorax, white on underside of femora, shining orange on inner side of hind tarsi, paler on inner side of other tarsi, a red tuft on inner side of anterior tibiæ near end, inner face of hind tibiæ delicately greyish-pruinose; abdominal bands pure white, interrupted, the second thinly continuous across the middle; hair of eyes long and white; top of head coarsely rugose; lower part of cheeks with a broad smooth bevelled area; mesothorax very closely and coarsely punctured, but posterior middle with a flattened more sparsely punctured area; scutellum very coarsely rugoso-punctate, rounded behind; axillar spines curved; mesopleura densely rugoso-punctate. Wings dusky, stigma dark reddish, nervures piceous; first recurrent joining second cubital cell very near base. Anterior coxæ spined. Abdomen strongly but not very densely punctured; foveæ at sides of second segment small; transverse impression on second segment very shallow in middle; fifth and sixth segments with lateral spines, those on sixth slender and sharp, about twice as long as those on fifth; apex with the usual four spines, the lower not greatly longer than the upper; a tuft of bright ferruginous hair near apex beneath; fourth ventral entire; fourth punctured practically as third, but fifth dullish, with extremely fine sculpture.

Kudia River, Siberia, July, 1 ♂ (*Cockerell*).

In Friese's key runs nearest to *C. acuminata*, but also allied to *C. elongata*. In both sexes *C. elongata* has long fulvous hair on eyes, while *C. acuminata* has shorter white hair. *C. kudiana* is intermediate, having long white hair. *C. kudiana* has the first recurrent nervure joining second cubital cell very near base; it is much more remote from base in *acuminata* and *elongata*. The fovea on sides of second segment in *kudiana* is small, as in *elongata*; in *acuminata* it is large. The fourth ventral is punctured like third, as in *acuminata*. Thus, the new species combines the characters of its two European allies. In my table of North-American males it runs straight to *C. angelica*, Okll.

Anthidium dinurum, sp. n.

♂ (type).—Length 12–13 mm.

Black, closely related to *A. florentinum* (Fabricius), but differing thus:—Pubescence of cheeks and pleura pure white; yellow marks above eyes smaller; thorax entirely without yellow markings; hair of vertex and thoracic dorsum blacker, quite black on vertex; mesothorax more finely rugose; tegulæ with no yellow mark. Wings suffused with blackish, not brown. Legs black. Yellow marks on abdomen smaller, but variable; lateral spines of fifth abdominal segment shorter, much shorter than those on sixth, and entirely black; median apical spine rather longer. The lateral apical-teeth diverge, and the hind femora have a large tubercle at base beneath.

♀.—Length 11–12 mm.

Differing from *A. florentinum* by the entirely black face, mandibles, and thorax, the black legs, and smaller yellow marks on abdomen, which are confined to the first five segments. The hair of the pleura is white; the ventral scopa is distinctly yellowish in middle, white at sides. The lateral teeth of sixth abdominal segment are subobsolete.

Okeanskaja, Siberia (type-locality), 2 ♂, Aug. 5, 1 ♀, Aug. 18 (*Cockerell*); Kudia River, Siberia, July, 2 ♀ (*Cockerell*).

Dianthidium (Anthidiellum) leucorhinum, sp. n.

♂.—Like *D. strigatum* (Latr.), but a little larger; spots on tegulæ and tubercles smaller; abdominal spots somewhat reduced and richer yellow. Seventh abdominal segment black, with a yellow stripe on each side. Legs black, with the knees pale red; anterior and middle tibiæ bright yellow

in front, hind tibiae yellow at apex, basitarsi pale yellow, small joints of tarsi light ferruginous. There are no light spots on the axillae; these may be present or absent in *I. strigatum*. As in *strigatum*, the face-marks are creamy-white. Ocelli red.

Kongaus, Siberia, August 1923, 1 ♂ (*Cockerell*).

Dianthidium sibiricum (Eversmann).

Kudia River, Siberia, July, 12 ♀, 4 ♂ (*T. D. A. and W. P. Cockerell*); Kongaus, Siberia, Aug., 2 ♀ (*Cockerell*).

On July 26 I noticed that this bee was a special visitor of a yellow-flowered *Sedum*; at the flowers of the same plant my wife caught the butterfly *Parnassius ev-rsmanni*, Mén.

Eversmann only described the female. The male has the clypeus, bow-shaped lateral face-marks, and greater part of mandibles yellow, but thorax entirely black; the sixth abdominal segment is broadly rounded and without teeth; scutellum not sharp-edged. In both sexes the hair on thorax above is pale fulvous, but thin and inconspicuous. The ventral scopa of female is cream-colour or practically white, ferruginous apically. The head of the ♀ is black, except a large round pale yellow spot on each side of the face. The lateral margins of abdominal segments are not toothed in the male.

Stelis aterrima melanura, subsp. n.

♀.—Like the European *S. aterrima* (Panz.), but punctures of mesothorax not so dense, more of the shining surface showing; hind margins of abdominal segments entirely black. It is readily known from *S. phæoptera* (Kirby) by the larger size (about or nearly 11 mm. long) and other characters, and from *S. murina*, Pérez, by the produced and pointed axillae.

Okeanskaja, Siberia (type-locality), 2 ♀, Aug. 18 (*Cockerell*); Kongaus, Siberia, 1 ♂, Aug. (*Cockerell*); Kudia R., July, 1 ♂ (*W. P. Cockerell*).

The Kongaus male has the wings very distinctly reddish, the others suffused with blackish.

Dasypoda japonica, Cockerell.

Okeanskaja, Siberia, Aug. 18, 1 ♂, 1 ♀ (*Cockerell*); Kongaus, August, 6 ♂, 1 ♀ (*Cockerell*).

Previously known only from Japan.

Clisodon furcatus terminalis (Cresson).

Kudia R., Siberia, July, 2 ♂, 1 ♀ (*T. D. A. and W. P. Cockerell*); Kongaus, August, 4 ♂, 5 ♀; Okeanskaja, August, 1 ♂, 2 ♀.

One of the Kongaus males has the light hair rufous, in the others it is white.

This differs very little from the European *C. furcatus* (*Anthophora furcata*, Panzer), but has more black hair on thorax above. It is indistinguishable from the common form of North America, described in 1869 by Cresson.

Anthophora vulpina pachypoda, subsp. n.

♂.—Similar to *A. vulpina* (Panzer) in structure, but middle and hind femora stouter, the middle ones excessively broadened, the lower side very convex; abdominal hair-bands pure white and distinctly broader; eyes without the reddish colour of *A. vulpina*; third antennal joint longer (656 microns in *pachypoda*, 560 in *vulpina*). The face-markings (with large black marks on clypeus) are as in *vulpina*; pale hair of thorax above white to greyish, not yellow; small joints of tarsi red as in *vulpina*.

Okeanskaja, Siberia, August 5, 1 ♂ (*Cockerell*).

Ceratina (*Ceratinidia*) *emigrata*, sp. n.

♀.—Length 7.5–8 mm.

Black, with yellow markings; mesothorax entirely black, polished on disc; tubercles yellow or (one of the Okeanskaja specimens) black. Differs at once from *C. hieroglyphica* and *C. morawitzii* by the absence of a vertical bar on clypeus; it is also quite distinct from *C. japonica*, Okll. There is much resemblance to the Philippine Islands *C. tropica*, Crawf., but the mark on scutellum is much smaller, U-like, or having the outline of a broad-brimmed hat, and the wings are much darker. In *C. tropica* the lateral face-marks are always divided into two spots; in *C. emigrata* they are slender and usually undivided, but sometimes divided (in one Okeanskaja specimen divided on one side and not on the other). The closest affinity is with *C. lepida*, Sm., of Northern India, which has the same brown wings. It differs from *lepida* thus:—Apical clypeal band interrupted in middle (greatly broadened and angulate in middle in *lepida*); frontal spots elongated (round in *lepida*); mark at upper end of cheeks narrow (broader and less divergent from orbits in *lepida*); scutellar mark as indicated above; area of metathorax

entirely opaque, including margin (margin moderately shiny in *lepida*) ; hind tibiae with a yellow basal stripe (wanting in *lepida*).

Kongnau, Siberia (type-locality), 2 ♀ (*Cockerell*) ; Okeanskaja, 2 ♀ (*Cockerell*).

Sphecodes sibiricus, sp. n.

♀.—Length about 8 mm. ; anterior wing 6 mm.

Robust, black, with the first three abdominal segments, except a broad transverse band, narrowed laterally, on third, bright ferruginous ; flagellum stout, obscurely reddened beneath ; hind spurs dusky red, with most of the apical portion (but not the tip) black ; pubescence greyish white, scanty ; tegulae large, testaceous. Wings strongly suffused with reddish brown, stigma and nervures dark brown, the basal nervure lighter. Head transverse, very broad, facial quadrangle much broader than long ; mandibles simple but not falciform, dark red apically ; third antennal joint a little shorter than fourth, but fourth not as long as second and third together ; clypeus low and transverse, rugoso-punctate, with a strong median sulcus ; front densely rugose ; cheeks shining, flattened ; mesothorax and scutellum very coarsely punctured, but shining between the punctures, which on disc of mesothorax are rather widely separated ; area of metathorax very coarsely plicate, becoming reticulate in the middle ; mesopleura very densely and coarsely punctured, with shining pits ; first recurrent nervure meeting second intercubital ; tarsi obscurely reddish, at first glance appearing black. Abdomen shining, with very fine punctures, extremely weak and sparse on first segment ; no depression between first and second segments in lateral view.

Kongnau, Siberia, August 9, 1923, 1 ♀ (*Cockerell*).

Very close to *S. japonicus*, Cockerell, from Japan, but apparently not its female, on account of the smaller stigma and less tapering marginal cell. The wings readily separate it from *S. oriundus*, Vachal (Japan), and *S. volatilis*, Smith (Transbaikal). In the European fauna it appears to be nearest to *S. scabricollis*, Wesmael, with which it agrees in the coloration of abdomen ; but the strongly brown wings separate it from this and from *S. schenckii*, v. Hagena.

Megachile ligniseca (Kirby).

Kudia River, Siberia, July, 1 ♀ (*Cockerell*) ; Okeanskaja, Aug. 5, 1 ♂ (*Cockerell*) ; Kongnau, Aug., 2 ♂ (*Cockerell*).

The Kongaus males differ from one from Berlin in having the scutellum with much black hair; the Okeanskaja male is smaller and the scutellum is denuded. As male *ligniseca* from England (Kingsdown, Sladen) also differs from the Siberian in lacking dark hair on the scutellum, the Kongaus male may stand as the type of a race *melanaspis*, nov., to which it may be presumed that the Kudia R. and Okeanskaja specimens also belong. In my English male the lobes of the transverse keel of the sixth abdominal segment are very prominent and obtusely pointed; in the Berlin and Siberian males they are more rounded and obtuse, though variable. I do not know whether the English race (typical *ligniseca*) has any constant differences from the continental form.

Megachile willughbiella kudiensis, subsp. n.

♂ (type).—Black hair on apical part of third abdominal segment; area immediately laterad of lateral ocelli shining; hind spurs red; anterior femora with a black apical patch covering outer face of keel. There is also a structural difference at the end of the abdomen. Friese describes the seventh segment in *M. willughbiella* as three-toothed. Actually the median process is the apex of the seventh segment, and the lateral ones are on the margin of the sixth. In European (Lugano, Friese) *M. willughbiella* the end of the seventh segment is produced and angular, while the lateral teeth are low and broad. In the *kudiensis* the seventh segment is as in the European, but the lateral teeth are much more acute. In the form *provecta*, described below, the seventh is broadly rounded, not angular, but the lateral teeth are practically as in typical *willughbiella*.

♀.—Differs by the abundant black hair on thorax above and on third abdominal segment; clypeus not so densely punctured in middle.

Kudia River, Siberia (type-locality), July, 11 ♂, 9 ♀ (T. D. A. and W. P. Cockerell); Kongaus, Aug., 1 ♀ (Cockerell).

Megachile willughbiella provecta, subsp. n.

♂.—Differs from *kudiensis* by the dark hind spurs, anterior femora with no distinct black patch on outer face of keel, and apical armature of abdomen as described above.

Kongaus, Siberia, Aug., 1 ♂ (Cockerell).

The Kongaus female recorded above should perhaps go here, but it has red spurs, and seems not to differ at all from *kudiensis*.

Megachile analis, Nylander.

Kudia River, Siberia, July, 2 ♂ (*W. P. Cockerell*).

These are without any special melanic tendency, in no way approaching Alfken's variety *obscura*.

NOMADA.

The following notes on little-known Indian species were made at the British Museum:—

- N. radiata*, Nurse, has dark veins, and b. n. a little basad of t.-m. : first r. n. joins second s.m. well before middle; third antennal joint longer than fourth (type-specimen).
N. arida, Nurse, has b. n. well basad of t.-m.; first r. n. joins second s.m. in middle; third antennal joint very oblique at apex, the short side considerably shorter than fourth joint.
N. solitaria, Smith, has first r. n. joining second s.m. before middle; b. n. meets t.-m.

LX.—*On a Collection of Mammals made by Mr. Latham Rutter in the Peruvian Amazons.* By OLDFIELD THOMAS.

THE British Museum has received from Mr. Latham Rutter a rather considerable collection of mammals, mostly small, collected by him on the Ucayali and Marañon Rivers, Upper Amazons. The collection is particularly rich in bats, of which Mr. Rutter has been most successful in getting the species which do not live in and around the houses, and are therefore brought home by every collector who works in the region. On the contrary, he has been able both to knock down bats on the wing, and to persuade the Indians to bring him in specimens. As a result, in place of the monotonously common *Molossus*, *Phyllostomus*, *Artibeus*, *Sturnira*, and so on, he has obtained examples of such rare genera as *Vampyrodes*, *Vampyressa*, and *Vampyriscus*, all three having been hitherto represented in the Museum by but very few specimens—of *Vampyriscus bidens*, previously only known by one skin, collected in 1868, he has sent about a dozen. Then there are examples of *Tonatia*, *Anthorhina*, *Chiroderma*, and *Diphylla*, all most welcome accessions to the Museum collection.

Then of rodents, he has sent examples representing new

subspecies of the rare Echimyinae—*Isothrix villosus* and *Mesomys ferrugineus*,—of which comparatively very few specimens are on record.

Altogether he is to be congratulated on obtaining a remarkable collection in a region that has always proved excessively difficult to work.

The two localities concerned in the descriptions are :—

Marisea, on the Rio Ucayali, about 8° 40' S.

San Lorenzo, on the Marañon, on the north bank nearly opposite the mouth of the Huallaga.

The following nine new forms appear to need description :—

Peronymus cyclops, sp. n.

Very similar to *P. leucopterus* externally, though the head is rather more olive-coloured than the back, instead of being the same uniform brown, and the interfemoral membrane is rather less hairy. Wings similarly whitish.

Skull larger throughout, the muzzle broader and heavier, and the brain-case more inflated. Interorbital constriction broader.

Dimensions of the type :—

Forearm 45 mm.

Head and body 50 ; tail 15 ; ear 17 ; third finger, metacarpus 40 ; lower leg and hind foot 24.

Skull : greatest length to front of canine 16·2 ; condyle to front of canine 14·5 ; breadth of muzzle 8 ; interorbital breadth 3·2 ; breadth of brain-case 7·8 ; mastoid breadth 9·2 ; maxillary tooth-row 6·5.

Hab. Ucayali. Type from Tushemo, near Marisea, 1000'.

Type. Adult male. B.M. no. 24. 3. 1. 6. Original number 255. Collected 3rd October, 1923, by Latham Rutter. Presented by Oldfield Thomas. One specimen.

No doubt very closely allied to the *P. leucopterus* of Guiana and the lower Amazon, but distinguished by its larger skull.

I confess to having great doubt as to the generic distinction of *Peronymus* from *Peropteryx*, as the difference in the shape of the muzzle described by Mr. Miller is really very slight, and the connection of the ears with each other is often scarcely perceptible. There is, however, a certain difference in the structure of the basal pits in the two groups, and on this account, and in deference to Mr. Miller's opinion, I here use the name *Peronymus* in a generic sense.

Artibeus pumilio, sp. n.

Size and most other characters about as in *A. toltecus rarus*, with which colour, skull, and teeth all agree, with the one

important exception that the postero-internal lobe of m^1 ("cusp 7"), on which Dr. Andersen* largely bases his classification of the group, is comparatively small, about as in *A. cinereus*. So much stress is laid on this character in Dr. Andersen's very careful monograph that I have no option but to consider it as of specific importance. The locality is also well separated from those of either of the other related species. Face-streaks and ear-edgings well marked.

Dimensions of the type:—

Forearm 37·5 mm.

Head and body 59; ear 16; third finger, metacarpal 36.

Skull: greatest length 19; length to front of canine 18·8; mastoid breadth 10; maxillary breadth across m^1 7·8; front of canine to back of m^2 5·9.

Hab. Tushemo, near Masisea, R. Ucayali. Alt. 1000'.

Type. Adult female. B.M. no. 24. 3. 1. 52. Original number 228. Collected 18th September, 1923, by Latham Rutter. Presented by Oldfield Thomas. One specimen.

Vampyrodes ornatus, sp. n.

Brighter coloured and with larger teeth than *V. caraccioli*.

Size slightly larger than in *V. caraccioli*. General colour stronger and brighter, the ground-colour of the back and centre of face near "mars-brown"; shoulders and sides of neck more whitish. Under surface dull brown. White stripes very distinct and beautifully contrasted, in the usual positions in this group, the median dorsal one commencing on the crown between the hinder ends of the strongly marked supraorbital lines, and running clear and sharply defined to the rump—much more strongly defined than in *caraccioli*. Edges of ears white.

Skull rather larger and more sharply ridged than in *caraccioli*; breadth across canines decidedly greater. Outer incisors not filling up the space between s^1 and the canines. Posterior molar appreciably larger.

Dimensions of the type:—

Forearm 54 mm.

Head and body 77; ear 20; third finger, metacarpal 52; lower leg and hind foot (c. u.) 33.

Skull: greatest length 27·3; condylo-basal length 25; zygomatic breadth 17; interorbital breadth 7; mastoid breadth 13·5; breadth across outer side of canines 7; breadth across m^1 12·1; front of canine to back of m^2 12·2; length of m^2 2·5 (2·2 in *caraccioli*).

* P. Z. S. 1908, pp. 313-14.

Hab. Marañon and Ucayali. Type from San Lorenzo, Rio Marañon, nearly opposite mouth of Huallaga. Alt. 500'. One specimen from Masisea, Ucayali, 1000'.

Type. Adult female. B.M. no. 24. 3. 1. 63. Original number 426. Collected 13th November, 1923, by Latham Rutter. Presented by Oldfield Thomas. Five specimens.

So far as I am aware, no specimen of *Vampyrodes* has been obtained since Mr. Caracciolo sent from Trinidad the type I described in 1889. These examples of this beautiful bat are therefore a very interesting accession. The Amazonian form is no doubt nearly allied to that of Trinidad, but may be distinguished by the characters above recorded.

Vampyressa venilla, sp. n.

Size smallest of the genus.

General colour wood-brown above, darker behind. Facial lines fairly well marked.

Skull considerably smaller than that of *V. thyone* and even smaller than that of the immature type of *V. minuta*, Mill. General shape about as in the former.

Incisors close together, filling up the space between the canines; the inner ones nearly parallel and touching, instead of being separated and convergent as in *pusilla* (as figured by Peters) and *thyone*. Molars with their transverse decidedly greater than their longitudinal diameters.

Dimensions of the type:—

Forearm 30.5 mm.

Head and body 43; ear 14; third finger, metacarpal 28; lower leg and hind foot 20.

Skull: greatest length 17; condylo-basal length 16; zygomatic breadth 10.3; interorbital breadth 5; mastoid breadth 8.4; front of canine to back of m^3 5.6; combined length of m^1 and m^2 2.3.

Hab. Marañon. Type from San Lorenzo, 500'.

Type. Adult female. B.M. no. 24. 3. 1. 73. Original number 417. Collected 12th November, 1923, by Latham Rutter. Presented by Oldfield Thomas. One specimen.

This pretty little bat belongs to a genus very rare in collections, our only previous examples of it being the typical series of *V. thyone*, and two specimens of *V. nymphaea*. It is considerably smaller than either of these and than *V. minuta*, Mill., but may not be much less than in the São Paulo *V. pusilla*, of which no skull-measurements are available. From this, however, it is readily distinguishable by the very different shape of the upper incisors and the greater proportionate breadth of the molars.

Proechimys hilda, sp. n.

A very large species, with fairly long palatal foramina.

Size as gauged by type-skull larger than in any other species of this region. Colour normal, the usual black-lined rufous above, and pure sharply defined white below, not buffy below as in *P. brevicauda*, or with any trace of the darker collar found in *gularis*. Feet brown externally, whitish along the inner margins. Tail strongly contrasted blackish and white.

Skull large and heavy, but not strongly ridged, in this respect contrasting markedly with that of *semispinosus*, the parietal ridges, even in the aged type, low and rounded, and not definitely continuous with those of the interparietal. Nasals extending but little further backward than the pre-maxillary processes. Palatal foramina fairly, but not very, long—longer than in *brevicauda*, shorter than in *pachita*, and with more development of the inturned posterior lips than in the latter. Choanæ broad, sharply angular, the angle level with the middle of *m*³. Bullæ of normal proportionate size.

Dimensions of the type:—

Head and body 282 mm.; tail lost (two-thirds of head and body in other, younger, specimens); hind foot 48; ear 22.

Skull: greatest length 65; condylo-incisive length 53·5; zygomatic breadth 29·5; nasals 24; interorbital breadth 13·3; breadth across parietal ridges 23·6; palatilar length 23; palatal foramina 6; upper tooth-series 8·7.

Hab. Marañon, just above the mouth of the Huallaga. Type from San Lorenzo. Alt. 500'.

Type. Old male. B.M. no. 24. 2. 22. 12. Original number 321. Collected 3rd November, 1923, by Latham Rutter. Presented by Oldfield Thomas. Four skins, but only one skull.

This fine spiny rat seems well distinguished from any of the neighbouring species. *P. brevicauda*, locally the nearest, is smaller (as are all the others), has a buffy belly and much shorter palatal foramina, while the Ecuadorean *P. semispinosus* has much more strongly defined parietal ridges.

Isotricha villosa mollis, subsp. n.

Essentially similar to true *villosa*, whose type-locality—Sarayacu—is some 150 miles further down the River Ucayali, but without the large dorsal black patch mentioned in both of the early descriptions and prominently figured in Castelnau's fine plate*. One of our three specimens has a faint darker

* Voy. Amérique du Sud, Zool. pl. xvii. (1855).

clouding in this region, but nothing to be called a "*magna macula nigra*." That that patch was not a result of age is evident from the fact that the type is slightly less old than our oldest specimen, as I have been able to verify on the skull, by the kindness of Prof. Anthony. Other characters, so far as can be made out on the figures, very much as in true *villosa*.

Dimensions of the type (measured in the flesh):—

Head and body 273 mm.; tail 245; hind foot 45; ear 16.

Skull: greatest length 58; condylo-incisive length 52.5; zygomatic breadth 30; nasals 17×8 ; interorbital breadth 15; upper tooth-series 12.2.

Hab. Tushemo, near Masisea, R. Ucayali. Alt. 1000'.

Type. Adult female. B.M. no. 24. 2. 22. 25. Original number 230. Collected 19th September, 1923, by Latham Rutter, and presented by Oldfield Thomas. Three specimens.

The presence or absence of the black on the back is just such a character as might be expected to distinguish two closely allied local races of these animals.

Mesomys ferrugineus spicatus, subsp. n.

Combining the information obtainable from the original type of *M. ferrugineus*, from three specimens collected by Mr. Rutter, and from what Mr. Osgood tells us * of the four specimens, nearly topotypes, collected by M. P. Anderson near Yurimaguas, it is evident that that species may be distinguished from the Lower Amazon *M. hispidus* † by the long and definite tassel at the end of the tail. When I suggested that *ferrugineus* might not be distinct from the latter the only known western specimen was the type, which, unfortunately, has lost the end of its tail; but now we find that all of the four perfect-tailed specimens that have since been collected in this region have tassels about an inch long on the end of their tails, thus clearly differing from those of *M. hispidus*, in which the hairs of the terminal third do not exceed about 10–11 mm. in length.

But of the Peruvian specimens, all referable to *M. ferrugineus*, there appear to be two races—the typical form, recorded from Chamicuro and Yurimaguas, on the Huallaga, and one now found by Mr. Rutter near Masisea, on the Ucayali.

The latter may be distinguished as follows:—

Size and other essential characters as in *ferrugineus*, but the general colour much browner, less ferruginous, the spines

* Publ. Field Mus. x. no. 8, p. 169 (1914).

† Cf. Ann. & Mag. Nat. Hist. (8) xviii. p. 298 (1916).

with dark brown subterminal and pale buffy terminal bands, the latter giving a conspicuously speckled appearance to the animal. In *ferrugineus* the dorsal spines are dark buffy or dull ochraceous, the ends of the spines not much lighter than their pale brown subterminal bands. Belly paler, near "warm-buff," instead of dark ochraceous. Feet dull brownish white instead of dull buffy.

Skull rather larger, more inflated, and with broader forehead than that of the type of *ferrugineus*, but the specimen measured by Mr. Osgood is of equal length.

Dimensions of the type (measured in the flesh):—

Head and body 200 mm.; tail 200; hind foot 31; ear 12.

Skull: greatest length 45·3; condylo-incisive length 40·5; nasals 13·2 × 5; interorbital breadth 11·5; palatilar length 14·2; upper tooth-series 7·2.

Hab. Tushemo, near Masisea, R. Ucayali. Alt. 1000'.

Type. Adult male. B.M. no. 24. 2. 22. 35. Original number 270. Collected 4th October, 1923, by Latham Rutter. Presented by Oldfield Thomas. Three specimens.

Marmosa rutteri, sp. n.

Allied to *M. germana*, but with shorter fur and more yellow underside.

General characters as in *germana*, the tail similarly hairy at base and not whitened terminally. Size as in that species. Fur comparatively short, hairs of back only about 8 mm. in length, as compared with 12–13, and markedly crisper and more velvety. General colour above finely mottled grey, slightly drabby, but not so brown as in *germana*. Sides rather more buffy. Under surface strong rich buffy, the hairs of the throat, chest, and inguinal region self-coloured buffy to the roots, those of the belly grey basally. Hands and feet dull whitish. Tail furry for about an inch at its base, but the hairs very short, only about 4–5 mm. in length; the remainder uniform pale brown, very slightly paler below than above, not lightening terminally.

Skull about as in *germana*, the supraorbital ridges well developed. Nasals with shorter posterior projection than in *domina*.

Dimensions of the type:—

Head and body 158 mm.; tail 218; hind foot 28; ear 23.

Skull: greatest length 41; condylo-basal length 41; zygomatic breadth 22·5; nasals 18 × 5·7; interorbital breadth 7·2; across supraorbital projection 9·5; front of canine to back of m^1 16·5; ms^{1-3} 7·0.

Hab. Rio Ucayali. Type from Tushemo, near Masisea. Alt. 1000'.

Type. Adult male. B.M. no. 24. 2. 22. 67. Original number 199. Collected 10th September, 1923, by Latham Rutter and presented by Oldfield Thomas.

This opossum is distinguishable from *M. germana* of Eastern Ecuador by its greyer colour and much shorter fur. It has considerable resemblance to *M. domina* of the Lower Amazon, but the shape of the nasals is different and the colour is again rather greyer, while the great difference in locality renders identity almost impossible. Cabrera's *M. polita*, from the Coca River, based on a young specimen with milk-dentition in place, is a much redder form than either this or the next species.

Since Mr. Osgood* has fallen into the same mistake as Sr. Cabrera about the relationship of *M. germana* to Tomes's *waterhousei*, I may here direct attention to the note† I have recently published on the latter species.

Marmosa maranii, sp. n.

A dark-coloured dark-tailed species of the group with projecting supraorbital processes.

Size medium, about as in *mitis*. General colour above warm brown, approaching "Prout's brown," not very different from the colour of the much smaller *M. madescens*. Under surface buffy, varying in intensity, the throat, chest, a median line down belly, and the inguinal region self-coloured buffy; hairs of sides of belly slaty-based. Orbital rings and sides of muzzle black. Hands and feet brownish white. Tail with half an inch at base hairy like the body; the rest practically uniformly brown, above and below, some almost imperceptible lighter patches terminally.

Skull of the broad triangular shape of this group, with heavy projecting postorbital processes overhanging the orbits. Nasals well broadened posteriorly.

Dimensions of the type:—

Head and body 130 mm.; tail 172; hind foot 21; ear 25.

Skull: greatest length 37; condylo-basal length 36.2; zygomatic breadth 20; nasals 16; interorbital breadth 6.7; breadth across postorbital processes 8.2; front of canine to back of m^4 14; ms^{1-3} 6.

Hab. R. Marañon, north side, just above junction with Huallaga. Type from San Lorenzo, 500'.

Type. Adult male. B.M. no. 24. 2. 22. 65. Original number 306. Collected by Latham Rutter. Presented by Oldfield Thomas. Two specimens.

The description of this opossum sounds rather like that of

* Publ. Field Mus. x. p. 150 (1914).

† Ann. & Mag. Nat. Hist. (9) vii. p. 522 (1921).

Osgood's *M. musicola* from Moyobamba, but the species is clearly distinct by its considerably greater size, as shown by the skull-measurements. In colour it is as dark as the members of the *fuscata* group, but its well-developed post-orbital processes show that it has no relationship to those forms.

It is noticeable that most of the *Marmosas* of this region, of all groups, tend to be dark-coloured, with the end of the tail not or scarcely lightened. *M. lepida*, however, described by me in 1888, and never received since, is a particularly brightly coloured little species.

On the basis of my conclusions about *M. impavida* (Proc. U.S. Nat. Mus. lviii. p. 248, 1920), Osgood's *M. impavida neglecta* (Publ. Field Mus. x. p. 187, 1915) should bear the name *M. noctivaga neglecta*.

LXI.—On a new Mite of the Genus *Chorioptes* parasitic on Goats in the United States. By STANLEY HIRST.

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Chorioptes texanus, sp. n.

Male with the flattened blade-like hairs on the abdominal lobes very much narrower than in *Chorioptes equi*, var. *capræ*, Gerv. & Bened. Outermost hair on each lobe also very different, being quite short and fine, whereas in *C. equi*, var. *capræ*, this hair is very long and thickened basally. Feet in both sexes normal for the genus, the stalk bearing the sucker (pulvillus) being short and unsegmented. First, second, and fourth legs of ovigerous female each with a terminal sucker, the third ending in long hairs, the sucker being absent.

Measurements.—♂. Length (including capitulum and abdominal lobes, but not hairs on latter) 260 μ ; greatest width 185 μ . ♀. Length (including capitulum) 298 μ ; greatest width 205 μ .

Material.—A few specimens of both sexes, with a label reading as follows:—"Scab mites from bodies of goats, collected by Dr. W. R. Sanderson. Near Brownwood, Texas. (19. ii. 1922.)"

These specimens were sent to the Museum by Mr. F. C. Bishopp, of the Bureau of Entomology, Dallas, Texas.

Note.—I have been able to examine specimens of the genus *Chorioptes* from horses, cattle, sheep, goats, and the huanaco. With the exception of the new species described above, they all appear to be referable to a single species, of which they are at most physiological varieties, seemingly showing a marked preference for their own particular host.

LXII.—*Note on a Flatfish new to the British Fauna,*
By J. R. NORMAN.

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THE British Museum has recently received from Professor W. M. Tattersall, D.Sc., of Cardiff, a fine specimen of the Greenland Halibut (*Reinhardtius hippoglossoides*, Walbaum), 720 mm. in total length. This specimen was captured off the south of Ireland (latitude 52° 30' N., 170 fathoms) by a trawler belonging to Messrs. Neale and West of Cardiff, and forwarded to Professor Tattersall by Mr. Morley H. Neale, who recognized that it was quite unlike any of the known British flatfishes. Normally an Arctic and Subarctic species, this fish has not previously been regarded as belonging to the British fauna, and I have been unable to trace any other records of its occurrence in our waters.

Reinhardtius hippoglossoides appears to be fairly common in the Arctic parts of the Atlantic, and ranges southward on the American coast as far as the Grand Banks off Newfoundland*. On the eastern side of the Atlantic its northerly range is much greater, as is the rule with marine animals, but it does not extend nearly so far southwards, and, according to Dr. Smitt†, "perhaps not much south of the 70th degree of latitude." Dr. Johannes Schmidt, who has kindly looked into the matter for me, informs me that "the Greenland Halibut occurs in the cold water north of the Iceland-Faroe Ridge, and round Iceland, although apparently scarce on the south coast."

With the exception of two or three stuffed examples from Greenland, described by Günther‡ as *Hippoglossus grandicus*, there is only one other specimen of this species in the British Museum collections. This was obtained in the fish-market, and was said to have been landed at Hull; but the locality at which it was caught is not known.

* Jordan & Evermann, Bull. U.S. Nat. Mus. xlyii. 1898, p. 2611.

† Smitt, 'Scandinavian Fish.,' i. p. 41 (1893).

‡ Cat. Fishes, iv. p. 404 (1862).

LXIII.—A new *Scoteinus* from Queensland.

By OLDFIELD THOMAS.

DURING Capt. G. H. Wilkins's collecting expedition to Australia he obtained in the southern part of N. Queensland a number of bats, including *Nyctophilus geoffroyi*, *Chalinolobus morio*, *Scoteinus greyi*, and the following new species of the last-named genus:—

Scoteinus influatus, sp. n.

A medium-sized species, much smaller than *S. rüppelli*, larger than *S. greyi* and *balstoni*.

Size decidedly less than in *S. rüppelli*, the forearm only 39 mm. as compared with 50 and the skull 16 mm. as compared with 19. More nearly approaching the W.-Australian *S. balstoni*. General colour (of spirit-specimen) brown, the underside not perceptibly lighter than the upper. The colour of the lower belly cannot be determined. Wings white-edged along their hinder margin. Ears of normal size and shape; tragus without any ridge across its outer surface. Postcalcareal lobule narrow but perceptible.

Skull more flattened than in *S. rüppelli*, shaped about as in *balstoni*, but much smaller than that of the former, larger than in the latter. A well-marked occipital helmet. No secondary cusp on i^1 .

Dimensions of the type (measured on the spirit-specimen):—

Forearm 39 mm.

Head and body (in flesh) 59; tail 31; ear 12; tragus on inner edge 3; third finger, metacarpus 36; lower leg and hind foot (c. u.) 23.5.

Skull: greatest length 16; condylo-canine length 15; zygomatic breadth 11.5; mastoid breadth 9.4; palato-sinual length 5; maxillary tooth-row 6.

Hab. (of type). Prairie, central part of southern North Queensland. Alt. 1400'.

Type. Adult male. B.M. no. 24. 3. 7. 4. Original number 186. Collected in 1923 by Capt. G. H. Wilkins. One specimen.

This species is conspicuously smaller than *S. rüppelli*, and is, perhaps, the E.-Australian representative of *S. balstoni*, than which it is larger, that bat having a forearm of 34–36 mm. and a skull measuring only 15 mm. in length.

The large *S. rüppelli* is absolutely a *Scoteinus*, showing no indication of the peculiar tooth-structure discovered and described by Mr. Miller in *Scotophilus*.

LXIV.—A new Fish-eating Rat from Ecuador.

By OLDFIELD THOMAS.

OUR generous contributor Mr. Ludovic Söderström of Quito has again sent us a number of small mammals, including examples of *Cænolestes* and other interesting forms. Among these there is a specimen topotypical of *Ichthyomys orientalis*, Anth., and a second fish-eating rat from north-western Ecuador which appears to represent a new species allied to *I. söderströmi*.

Ichthyomys caurinus, sp. n.

Closely allied to the Quito species, but slightly larger. Fur shorter and closer, hairs of back (apart from the longer piles) about 6 mm. in length. Colour throughout quite as in that animal, the tail similarly uniform black.

Skull rather larger than that of *söderströmi*, with larger brain-case, the distance from the upper edge of the *foramen magnum* to the supraorbital foramina just on 19 mm. as compared with an average of 17 mm. in a series of the allied species. Malars present in type. Nasals long, produced into a narrow point posteriorly. Cranial ridges distinct. Parapterygoid fossæ distinct and broad, the ectopterygoids well developed; in *söderströmi* the ectopterygoids are little perceptible and the parapterygoid fossæ quite narrow.

Upper incisors less specialized than in *söderströmi*, broader, less twisted, the front surface flatter, and of a much stronger yellow. Molars as in *söderströmi*, smaller than in *twedii*.

Dimensions of the type:—

Hind foot (wet) 35 mm.; ear 10.

Skull: greatest length, condyle to gnathion, 33·2; condylo-incisive length 32·4; zygomatic breadth 16·3; nasals 13; intertemporal constriction 5; greatest posterior breadth 16·5; palatilar length 14; palatal foramina 6·6; upper molar series 4·5.

Hab. North-western Ecuador, in comparatively low country. Type from below Gualea, about 2000–3000 feet. Another specimen from Paramba, 3000 feet.

Type. Adult male (the basilar suture not closed). B.M. no. 24. 4. 18. 7. Provisional number 7. Collected by natives and presented by Mr. Ludovic Söderström.

This comparatively lowland species is no doubt nearly allied to the Quito *I. söderströmi*, which lives at 9000–10,000 feet, but is distinguishable by the characters detailed

above. Another allied lowland species—*I. tweedii*, Anth.,—occurs in southern Ecuador (Provincia del Oro), but is decidedly larger than *I. caurinus*.

This adds another to the many forms of this interesting group which that keen naturalist Mr. Söderström has been instrumental in discovering.

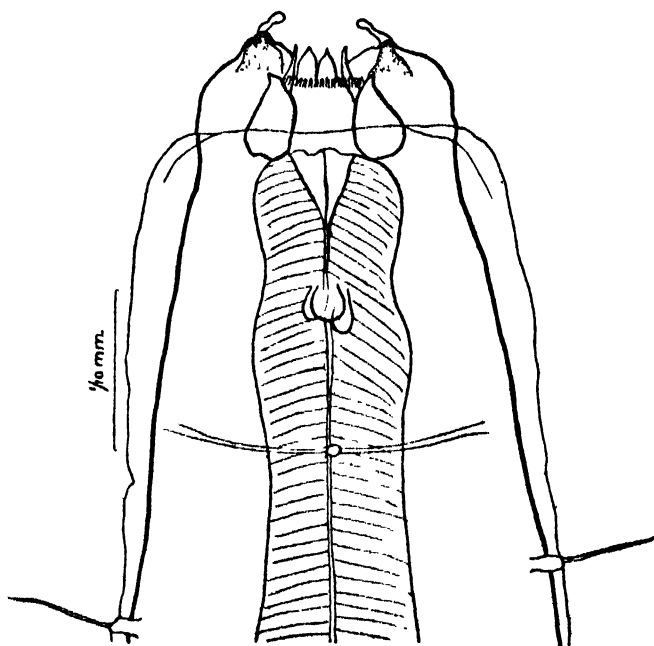
LXV.—*Description of a new Nematode, Oesophagostomum mwanzæ, from the Wart-hog.* By R. DAUBNEY, M.Sc., M.R.C.V.S., Ministry of Agriculture and Fisheries.

THE specimens from which this species is described were taken from a wart-hog (*Phacochærus æthiopicus*) at Sngayo, Mwanza, by Mr. A. Loveridge. It is stated on the label that the worms were in the stomach. The material consists of one male and five females.

The male measures 13 mm. in length and 0.48 in maximum thickness; the females from 15 to 20 mm. and up to 0.72 mm. respectively. The anterior end of the worm is straight, but the posterior end is curved dorsally into a hook in the male specimen and also in three of the females. There are no lateral alæ. The mouth-collar is high and there is a pronounced cuticular inflation at the anterior end. This cuticular inflation or vesicle extends on the ventral surface to the level of the excretory pore (at about 0.16 mm. from anterior end), at which point it is sharply constricted by the well-defined ventral groove. Dorsally and laterally the inflation subsides gradually, disappearing at about 0.22 mm. from the anterior end. The long and slender cervical papillæ are situated at from 0.36 mm. to 0.4 mm. from the anterior end in the female and at 0.32 mm. in the male specimen. They are thus at about the level of or slightly posterior to the junction of the anterior and middle thirds of the oesophagus. The buccal capsule is well developed, having a depth of about 0.054 mm. In transverse section it is elliptical, the dorso-ventral diameter, which is the greater, measuring about 0.126 mm. The lateral diameter is about equivalent to the depth of the capsule. The wall of the capsule is noticeably thickened at its base. The external leaf-crown consists of six broad pointed elements, outwardly curved at their tips. The internal leaf-crown is not easily made out, but it appears to be composed of from forty to fifty small rectangular elements. The oesophagus is club-shaped and measures from

0·7 mm. to 0·8 mm. in length. The maximum thickness of the posterior enlargement is from 0·19 mm. to 0·22 mm. The oesophageal funnel, which is rather long and slender, is not particularly well developed. At the base of the oesophageal funnel the covering of the segments of the oesophagus is thrown into three well-defined cuticular flaps or valves. The nerve-ring is situated at 0·35 mm. from the anterior end and just behind the level of the cervical papillæ.

Fig. 1.



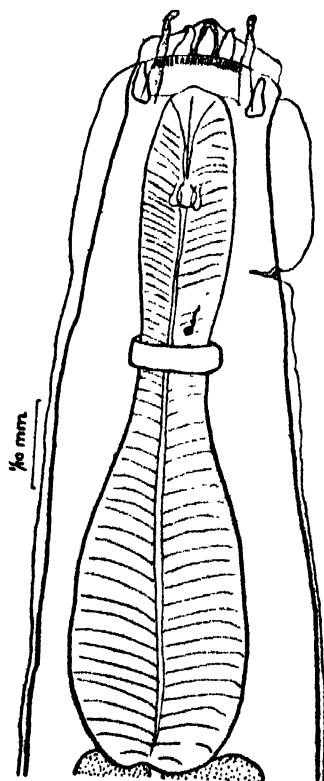
Anterior end of female, ventral view.

The tail of the female is short and stumpy, measuring about 0·08 mm. from the tip to the opening of the anus. The vulva is placed at from 0·12–0·21 mm. from the posterior end. Its lips are somewhat prominent. At the level of the vulva the body of the worm is sharply constricted and the posterior portion is bent dorsally. The tip of tail, however, usually points in the ventral direction (fig. 3). The vagina runs forwards from the vulva for a distance of about 0·48 mm.

The eggs in the uteri are unsegmented and measure 0·065–0·07 mm. by 0·036–0·043 mm.

The bursa of the male is of the type usual to this genus. The spicules are long and filiform, with somewhat flattened tips, which in the single specimen available appear to be fused. They measure 2·075 mm. in length. The accessory

Fig. 2.

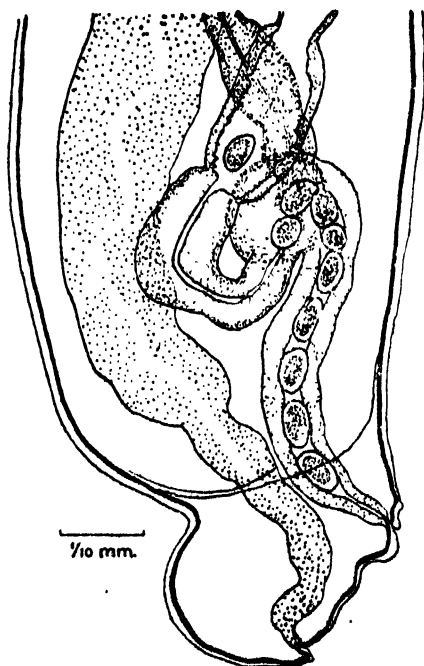


Anterior end of female, lateral view.

piece (fig. 4, *a* and *b*) is 0·13 mm. long. When viewed in the dorso-ventral position, its outline is that of the blade of a pointed spade. In the lateral position it is seen to be hooked ventrally at its anterior extremity. The length of the spicules and the position of the vulva and anus in the female

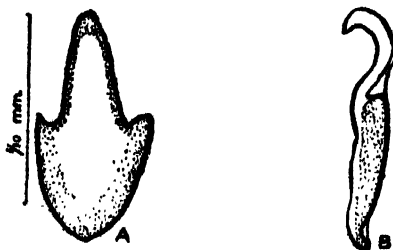
readily serve to distinguish this species from *O. dentatum*, the only species hitherto recorded in Suidæ.

Fig. 3.



Posterior end of female, lateral view.

Fig. 4.



Accessory piece of male. A, ventral view; B, lateral view.

Railliet and Henry (1913) divided the œsophagostomes of Ungulates into two subgenera—*Histeracrum*, in which the
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cervical papillæ are post-œsophageal, and *Proteracrum*, in which the cervical papillæ are in the œsophageal region, the cephalic vesicle only slightly or not at all swollen, and well-developed lateral alæ present. The type-species of the genus—*O. dentatum*,—from the pig, does not appear to belong to either of the subgenera proposed.

Ihle (1922) has created another subgenus—*Conoweberia*,—which he defines as follows:—"Subgenus *Conoweberia*, Ihle, 1922. Cuticle of neck inflated between mouth-collar and groove. Cervical papillæ close behind middle of œsophagus. No lateral cuticular membranes. Mouth-capsule has shape of truncated cone. Œsophageal funnel with three teeth behind mouth-capsule. Vagina long, from vulva directed to the front. Type *O. apiostomum*, other species *O. brumpti*."

O. mwanzæ has certain essential features in common with *O. apiostomum* and *O. brumpti*. The position of the cervical papillæ in the œsophageal region, the absence of lateral alæ, and the length of the vagina may be cited as points of resemblance. The mouth-capsule, however, is not conical in *O. mwanzæ*, and there are no teeth in the œsophageal funnel.

For the present, it seems sufficient to indicate that the new species appears to approach most closely the two species *O. apiostomum* and *O. brumpti*.

The material has been made available for description through the kindness of Dr. H. A. Baylis, and the type-specimens are in the collection of the British Museum (Natural History).

REFERENCES TO LITERATURE.

- IHLE, J. F. W. 1922. "On *Œsophagostomum apiostomum* (Willach, 1891), and some Remarks on the Classification of the Strongylidæ," *Bijdr. tot. de Dierk.*, Amsterdam, xxii, pp. 89-93.
 RAILLIET, A., and HENRY, A. 1913. "Sur les *Œsophagostomiens des Ruminants*," *Bull. Soc. Path. exot.*, Paris, vi, p. 507.

LXVI.—On the Stethaspis Group of Melolonthid Coleoptera. By GILBERT J. ARROW, F.Z.S., F.E.S.

IN the *Ann. & Mag. Nat. Hist.* (ser. 7, vol. xi. 1903, p. 303) I published a note upon the genera of this group, but without attempting any elucidation of the species, most of the types of which were then inaccessible. Since that date the types

of Blackburn and Broun have come into the keeping of the British Museum and by comparison of these with the type of *C. suturalis*, F., and with co-types of Blanchard kindly sent from the Paris Museum by M. Lesne I have been able to establish the identity of all the described species to my own satisfaction, with the exception of *Chlorochiton chlorophyllus* and *Stethaspis eucalypti* of Boisduval. The types of this author I have not been able to trace. *S. orpheus*, Fauvel, I suspect of being a specimen of *S. latus*, Bl., accidentally introduced into New Caledonia.

It is impossible to determine from Boisduval's figure and description to which form the name *Micronyx chlorophyllus* belongs. The references to the emarginate clypeus, the "granular" pronotum, and rows of elytral punctures almost certainly exclude the two species here described as new, but of the remaining species none agrees better than the others with the very vague characterization and impressionistic figure, and unless the type can be examined this problem will remain unsolved. On the whole, it seems most probable that the name is a synonym of *C. suturalis*, F., as supposed by Gemminger and Harold.

The types of the new species here described are in the British Museum.

Stethaspis squamosus, Lea (Trans. R. Soc. S. Austr. vol. xliii. 1919, p. 192), differs in many important respects from all other known species, and I now consider it generically different. I therefore separate it by the name of

LEPIDOSTETHASPIS, gen. nov.

It differs from *Stethaspis* in the antennæ with joints 3 to 5 equal and the club very short and 4-jointed in both sexes, the short legs with closely articulated tarsi, not bearing comb-like rows of spines beneath, the basal joints of the hind tarsus elongated, the sternal process clavate instead of pointed, and the substitution of broad flat scales for hair upon the lower surface.

The genus *Homolotropus* of Macleay (Trans. Ent. Soc. N.S. Wales, vol. ii. 1871, p. 193), placed by him in the present group, seems to have remained unrecognized since. It is not mentioned by Blackburn.

Genus *STETHASPI*, Hope (= *Xylonychus*, Blanch., 1850).

Blackburn made two attempts to tabulate the species of *Stethaspis* (in 1911 and 1912), but both are misleading, owing to his regarding as constant accidental differences in the clothing of hair and setæ and the impossibility to him of determining *S. eucalypti*, Boisd., and *lætus*, Bl. The distinction "pronotum non-pilose" and "pronotum entirely pilose," applied to *S. sternalis* and *monticola* in the later table is also misleading, for in the British Museum there is a male of the former of which the pronotum is more pilose than that of a female of the latter.

The names *eucalypti* and *lætus* he has assigned to two similar forms, of which one has six and the other five lamellæ in the antennal club of the male. The former appears to be the predominant form, and, although no exact information is available, it is probable that this is rightly regarded as *S. eucalypti*. The form with only five lamellæ Blackburn has called *S. lætus*, but the ♂ co-type I have been able to examine proves to belong to an intermediate phase with five long lamellæ and one (the first) about a third as long. This fourth joint of the antenna is found, when a series of specimens is compared, to be quite inconstant in its length, although never as long as the last five, and I therefore cannot regard the degree of its development as having any specific importance. Similar variability is found in the fifth joint of the female antenna, the latter having a club of four or five joints or of a condition intermediate between the two. Other species show instability in the degree of elongation of the joints at the anterior end of the club. In *S. piliger*, Bl., it is the third joint which is liable to vary in this way. In *S. monticola*, Blackb. (of which the type is the only ♂ I have seen), not only is the fourth joint not produced, but the fifth is shorter than those that follow it and the last are shorter than the club of the closely-related *S. sternalis*, Blackb. It seems likely, therefore, that these will prove to be distinct species.

The following table will, I believe, prove more serviceable than the previous attempts:—

Key to the Species of Stethaspis.

- 1 (4). Mesosternum strongly and acutely produced.
- 2 (3). Antennal club of ♂ 6-, of ♀ 5-jointed . . . *lætus*, Blanch.

- 3 (2). Antennal club of ♂ 5-, of ♀ 4-jointed var. *pentaphyllus*.
 4 (1). Mesosternal process scarcely produced.
 5 (12). Elytra closely and deeply sulcate.
 6 (9). Large species. (Eastern Australia.)
 7 (8). Antennal club of ♂ not long, the five terminal joints unequal *monticola*, Blackb.
 8 (7). Antennal club of ♂ long, the five terminal joints equal *sternalis*, Blackb.
 9 (6). Small species. (Tasmania.)
 10 (11). Green; pronotum not densely hairy *dispar*, sp. n.
 11 (10). Black; pronotum densely punctured and hairy *nigrescens*, Blanch.
 12 (5). Elytra less closely and deeply sulcate *piliger*, Blanch.

Stethaspis dispar, sp. n.

Sat læte olivaceo-viridis, corpore subtus fusco, pronoto plus minusve infusato, antennis pedibusque rufis.

Ovalis, nitidus, supra leviter, subtus dense albo-pilosus; elytris profunde punctato-sulcatis; pygidio longe hirsuto; mesosterno acute angulato, haud producto:

♂, clypeo opaco, dense rugoso, vertice et pronoto crebre punctatis, sat dense erecto pilosis, pedibus longis, tibiis anticis sat fortiter haud acute bidentatis, antennarum articulo tertio antice angulato, articulis 6 ultimis quam stipite multo longioribus, 4° per paulo breviori:

♀, clypeo rugoso sed nitido, vertice modice, pronoto laxe, punctatis, parce pilosis, pedibus brevioribus; tibiis anticis dente tertio obtuso armatis; antennarum articulo tertio gracili, quarto brevissimo, clava breviter 5-lamellata, quarum lamellis duabus internis brevioribus.

Long. 17-19 mm.; lat. 9-10 mm.

Tasmania: Launceston.

Type in the British Museum.

This hitherto overlooked species was taken in Tasmania both by Simson and by Commander J. J. Walker. It is closely related to *S. nigrescens*, Bl., the female of which I have not seen, and of similarly small size, but has the general colouring of *S. lætus*, with the pronotum more or less clouded with brown or black. The pronotum is unevenly and rather sparingly punctured in the female, and closely and regularly in the male, but much less closely than in that sex of *S. nigrescens*, Bl., and the club of the antenna, although longer than the foot-stalk, is considerably shorter than in that species.

Genus CHLOROCHITON, Arrow (= *Neostethaspis*,
Dalla Torre).

The catalogues contain only a single species of this genus, but I refer to it no less than four.

In the paper already referred to I announced that *Paranonca prasina*, Cast., formerly regarded as a synonym of *Chlorochiton suturalis*, F., must be transferred to the Rutelinae. In the since-published catalogue of Dalla Torre Castelnau's name figures still as a synonym of *C. suturalis*, but *Chlorochiton prasinus*, Broun, a species closely related to *C. suturalis*, is transferred to a new genus, *Neostethaspis*. This is probably the result of a misconception of the purport of my remarks, coupled with the confusion caused by the use of the name *prasinus* for two quite different insects.

Key to the Species of Chlorochiton.

- | | |
|--|-----------------------------|
| 1 (2). Third joint of the antenna not shorter than the fourth | <i>longicornis</i> , sp. n. |
| 2 (1). Third joint of the antenna shorter than the fourth. | |
| 3 (6). Elytral striæ feebly punctured (front tibia of ♂ tridentate). | |
| 4 (5). Pronotum closely punctured, with the hind angles blunt; elytra very smooth | <i>lævis</i> , sp. n. |
| 5 (4). Pronotum rugosely punctured, with the hind angles a little produced; elytra striated .. | <i>suturalis</i> , Fab. |
| 6 (3). Elytral striæ strongly punctured (front tibia of ♂ bidentate) | <i>prasinus</i> , Broun. |

Chlorochiton longicornis, sp. n.

Læte viridis, pronoti lateribus, elytrorum marginibus angustissime, processu sternali, femoribus, tarsis antennisque flavibus, corpore subtus fusco, dense griseo-hirto.

Elongato-ovalis, sat convexus, capite opaco, clypeo minute ruguloso, fronte et pronoto crebre punctato, hujus linea mediana fere lævi, angulis haud productis, scutello minute punctato; elytris bene striatis, striis lævissime punctatis, intervallis leviter convexis, minutissime punctulatis, lævibus; pedibus sat gracilibus, antennarum articulis 3 et 4 longitudine æqualibus:

♂, antennarum clava quam stipite longiori, tibiæ anticæ dente tertio obsoleto, tarsis 4 posterioribus quam tibiis longioribus:

♀, tibia postica apice lata, tarso ad tibiam æquilongo.

Long. 19-23 mm.; lat. max. 11-13 mm.

New Zealand: Auckland (Broun); Little Barrier (H.

Swale); Otira (*T. R. Harris*, Jan.); Waitaki, Te Aroha (*A. E. Brookes*, June); Titirangi (*Brookes*, Oct.).

This is the species figuring in Broun's manual as *Stethaspis australis*, and, so far as the specimens which have reached Great Britain afford an indication, it is the most abundant. It is a little more elongate in shape than the other three and generally of a brighter green colour. It is most easily recognized by the nearly equal length of the third and fourth joints of the antenna and the great length of the club of the male. The uppermost tooth of the front tibia is also feebler in the latter sex than in the other species. The front edge of the clypeus is not indented in the middle, the surface of the head is opaque, not shining, the puncturation of the pronotum, although close, is rather less coarse than in the congeners, the hind angles are a little blunter, and the elytral striæ are well marked but very feebly punctured.

Chlorochiton lævis, sp. n.

Læte viridis, lævis, pronoti lateribus elytrorumque sutura anguste, antennis genubus tarsisque flavibus, corpore subtus dense griseo-hirto.

Breviter ovalis, convexus, clypeo punctato-rugoso, margine antico truncato, fortiter reflexo, fronte et pronoto crebre punctatis, hujus angulis posticis haud productis, fere quadratis; scutello minutissime punctato; elytris lævissime striatis, striis parum distincte punctatis, interstitiis planis, minutissime parum crebre punctulatis, lævibus; pedibus sat gracilibus, antennarum articulo 3° quam 4° paulo breviori:

♂, antennarum clava ad stipitem longitudine fere æquali, tibia antica fortiter 3-dentata, tarsis omnibus quam tibiis longioribus:

♀, tibiis anticis latis, posticis apice latis.

Long. 21 mm.; lat. max. 12 mm.

New Zealand: Nelson, Mt. Hope (16. ii. 15).

Three specimens in the British Museum were sent to me by the late Major T. Broun. Three more captured on the same occasion have been submitted to me by Mr. A. E. Brookes.

It is a rather short and very convex species, with very smooth and lightly striated elytra. The clypeus is not very short and narrows a little to the front margin, which is strongly reflexed and a very little excised in the middle. The pronotum is rather finely and closely but not confluent punctured and its hind angles are not produced.

The third joint of the antenna is a little shorter than the fourth and the club is not longer than the foot-stalk.

There is a close resemblance to *C. suturalis*. F., of which the type is in the Banks Collection in the British Museum; but in that the clypeus is a little shorter, the pronotum more densely sculptured, and the elytra less smooth.

Chlorochiton prasinus, Broun.

This species is of a deep but clear green colour, with the outer margins of the elytra yellow and the sutural margin and the sides of the prothorax not distinctly so; but the colours of these insects are so subject to change that little importance can be attached to them. The structural characters, though not obvious, are well marked. There is a slight excision of the front margin of the clypeus, which does not distinctly taper. The whole head and pronotum are strongly and rather evenly but not rugosely punctured, the latter with regularly rounded sides. The elytral striæ are strongly and deeply punctured and the intervals convex. The uppermost tooth of the front tibia is remote from the second in the female and almost obsolete in the male, and the tarsi are shorter than usual, the hindmost in the male not longer than the tibia. The third joint of the antenna is short and the club of the male not long.

Genus *COSTLEYA*, Broun.

This genus was formulated by Broun in 1893 for *C. discoidea*, Broun, the bicuspid mesosternal process being regarded as its cardinal feature; but in describing a second species, *C. simmondsi*, he seems not to have noticed that this feature was absent. In *Chlorochiton suturalis* the sternal process may or may not exhibit a similarly bicuspid tip, so that no weight can be attached to it. The genera are, therefore, more closely related than was supposed. In *Costleya* the sternal process is shorter and the elytral sculpture is stronger; but should a species be discovered which is intermediate in these respects it would not be possible to retain the genus.

The known species of *Costleya* may be tabulated as follows:—

Key to the Species of Costleya.

- Mesosternal process double *discoidea*, Broun.
 Mesosternal process single.
 Small species, with the mesosternal process late-

- rally compressed, the metasternum not thickly pubescent *simmondsi*, Broun.
 Large species, with the mesosternal process not distinctly compressed, the metasternum thickly pubescent *lineata*, sp. n.

Costleya lineata, sp. n.

Viridis, vel viridi-aurea, fronte inter oculos interdum fusco-bimaculato, elytrorum costis 5 saturatius coloratis corporeque subtus nigrescenti, elytrorum margine externo femoribusque pallidis.

Late ovalis, nitida, clypeo dense, fronte et pronoto fortiter, subdense, punctatis, pronoto parum convexo, angulis omnibus paulo productis, posticis obtusis; scutello fere impunctato; elytris profunde punctato-sulcatis, intervallis alternis alte elevatis; mesosterno acute producto, processu vix compresso; metasterno longe et dense griseo-pubescenti.

Long. 19 mm.; lat. max. 10-11 mm.

New Zealand, North Island: Okakune (*T. R. Harris*); Black Ball (*T. R. Harris*, 1st Jan.).

This is the largest of the three known species of the genus and, although the colour appears rather inconstant, differs by its brighter hue, by the small dark spots upon the forehead, the five strongly elevated and deeply pigmented elytral costæ, and the uniformly coloured pronotum. In the coarse puncturation of the head and pronotum, as well as the form of the mesosternal process, the new species resembles *C. simmondsi*, but the elytra are rather less strongly punctured, the alternating intervals are very distinct, and the lower surface is much more closely hairy.

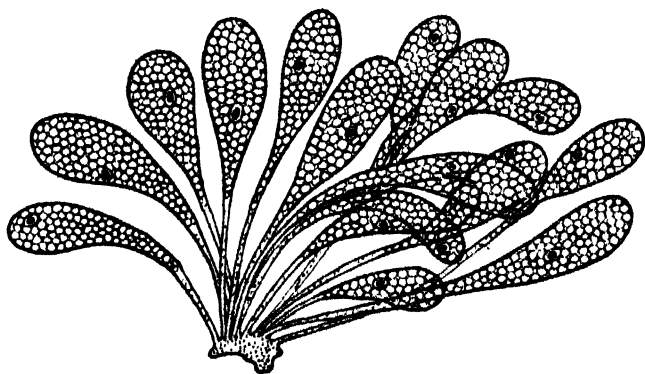
LXVII.—*Polythai helodrili*, gen. et sp. n., a new Cœlozoic Parasite of the Earthworm. By W. HAROLD LEIGH-SHARPE, M.Sc. (Lond.).

WHILE dissecting out a nephridium from the intestinal region of a specimen of *Helodrilus* (*Allolobophora*) *longus*, Ude, obtained from the Chelsea Physics Gardens, London, on February 4th, 1924, I discovered a cluster of organisms which I suggest resemble the Cœlozoic allies of *Toxosporidium* which have been found in the Polychæta. I am not aware of any members of this group recorded from an earthworm, and therefore propose the name of *Polythai helodrili* for these organisms.

The concavity of the common base from which the cluster arises follows the convexity of the wide loop of the nephridium, to which it is but lightly affixed, as it floated away from the nephridium as soon as the stain was applied. The parasite must therefore be regarded as Cœlozoic.

The whole cluster is fan-shaped, but little larger than a nephrostome, and not quite all the individuals—namely, those curving towards the spectator—are included in the figure.

Each individual is clavate and attached to the common base by a long and narrow stalk. The cell-wall is deeply and easily stainable at the broad end with picro-carmin, not so deeply on the stalk. A nucleus is discernible in the broad end, near the stalk, easily stainable with hæmalum. The



Polythei helodrilii, gen. et sp. n.

cell-contents appear vesicular, except in the base, where they are granular. Between the vesicles the contents were at first granular, but the granules disappeared on staining.

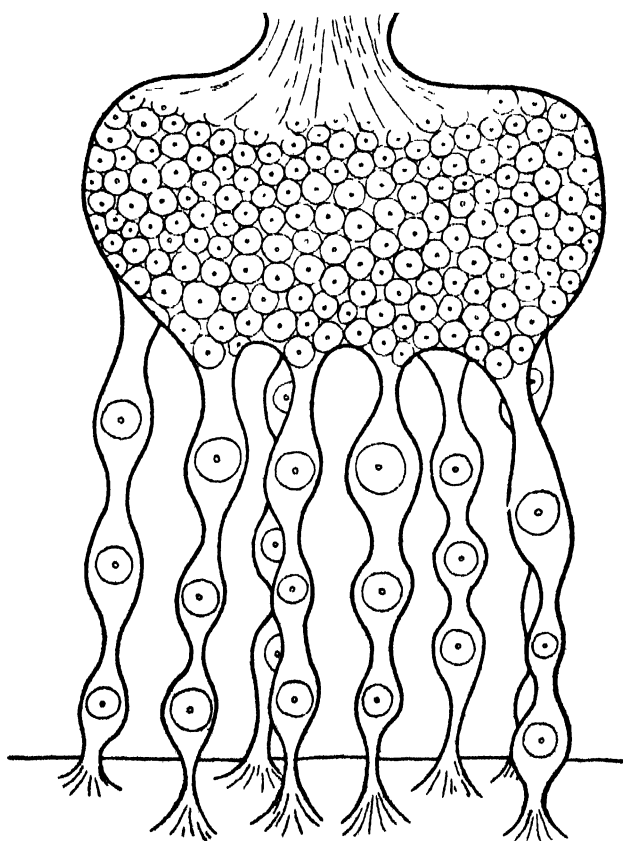
There still remains the possibility that these are normal or abnormal cells of the earthworm, notably modified chloragogen cells, but I cannot say that I have ever found the latter clavate, with so peculiar a nucleus, nor on similar stalks.

LXVIII.—An Abnormal Ovary in an Earthworm.

By W. HAROLD LEIGH-SHARPE, M.Sc. (Lond.).

On January 31st, 1924, I discovered on the left side of segment 13 in a *Helodrilus (Allobophora) longus*, Ude, an

ovary in which the ripe ova, instead of descending, as usual, into a single long tail, had descended into eight such tails arranged in a circle depending, like the arms of a medusa, from the substance of the ovary. What is of even more



An Abnormal Ovary in an Earthworm.

interest is that the usual receptaculum ovarum appears to be absent, and the posteriorly-pointing ends of the ovarian tails, expanded funnel-wise, are fused to the septum dividing segments 13 and 14, which was in consequence ascertainably

perforated in five places, and probably in all eight. In the absence of an oviduct the ova would inevitably be free in the cavity of segment 14, and perhaps rely upon their greater number to be crowded out of the female genital aperture. On the right side of the animal both the single-tailed ovary and the receptaculum ovarum are normal. The earthworm was from the Chelsea Physics Gardens, London.

LXIX.—*Two new Mammals from Pemba Island, East Africa.* By P. S. KERSHAW.

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THE following two new mammals were obtained on Pemba Island by native collectors employed by Mr. Arthur Loveridge, who has done so much to increase our knowledge of East African fauna, and sent to this country by Dr. Aders, the Health Biologist of Zanzibar. Mr. Loveridge has kindly presented the type-specimens to the British Museum.

Cephalophus melanorheus pembæ, subsp. n.

Colour of body above and below almost exactly as in *schusteri* of the mainland, the back and top of the head being perhaps a shade lighter. The legs are, however, differently coloured. The fore legs in *pembæ* fawn-coloured, with a narrow dark line on the front extending from the shoulder to the hoof. The hind legs are fawn-coloured, with a narrow dark line in front beginning 92 mm. above the hoof, at first faint, then increasing in breadth and intensity to the hoof.

Measurements (taken from the flat skin):—

Head and body 665 mm.; tail 51; hind foot 175.

Skull: greatest length 123; condylo-basal length 114; basal length 107; greatest breadth 57; greatest breadth of nasals 20; greatest breadth of brain-case 43·5; upper tooth-row 33; gnathion to pm^1 38·5; height of orbit 24; horns 37.

Type. Adult female (flat skin). B.M. no. 24. 3. 8. 11. Collected 5th October, 1923, by a native collector for Mr. Loveridge.

Type-locality. Vitongozi, Pemba Island, E. Africa.

Another skin, ♂, is in the collection of Mr. Loveridge.

Dendrohyrax adersi, sp. n.

A handsome golden-brown species, with snow-white underparts.

Hairs of back grey at the base and with raw-sienna sub-terminal rings. Mixed with these are numerous completely black hairs of somewhat stiffer texture, while here and there is a long isolated white bristle. The general effect is a rich dark golden brown. Rather lighter over the shoulders. Inside of ears grey. Hairs of dorsal spot dark slate-grey, with terminal third yellowish white. Colour of back separated from the snow-white underparts by a comparatively broad grey area. Hairs of underparts white to the base except for a small median longitudinal grey band on the throat and chest. Outside of limbs rather lighter than colour of back.

Measurements:—

Head and body 500 mm. ; hind foot 75 ; ear 30. (These were taken by a native collector, so must not be regarded as accurate.)

Skull: occiput to tip of nasals 99; condylo-basal length 100; zygomatic breadth 56; least interorbital breadth 27; upper premolars and molars 36; diastema of upper jaw 16. Bony orbit not quite complete.

Type. Adult male, stage VIII. (flat skin). B.M. no. 24. 3. 8. 12. Collected 10th September, 1923, by a native collector for Mr. Loveridge.

Type-locality. Weto, Ngozi, Pemba Island, East Coast of Africa.

This beautiful species appears to have some affinity with the mainland form *D. terricola* of Usambara so far as colour is concerned, but, to judge from Mollison's description, *adersi* is evidently a much more striking animal. The skull is characterized by its shortness and broadness. While it is rather shorter than that of *terricola*, yet the zygomatic breadth is 56 as opposed to 51 in the latter.

A local form from Amani in Usambara has been described by Brauer under the name *D. terricola vosseleri*. This is a much lighter-coloured animal.

The Zanzibar species, *D. neumanni*, an almost uniform brown form with yellowish-white underparts, belongs to a different group.

LXX.—*Further Note on a new Trematode from the Grass-snake.* By H. A. BAYLIS, M.A., D.Sc., and H. GRAHAM CANNON, M.A.

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IN the February number of this Journal we published* a description of a new genus and species of Lepodermatidæ from the grass-snake, naming it *Encyclometra natricis*. The February number was issued on January 31st, 1924. By an unfortunate coincidence (recalling the well-known case of *Lepoderma*, Looss, and *Plagiorchis*, Lühe, in 1899), a description of what is undoubtedly the same species, by M. J.-G. Baer †, appeared on the same day under the name of *Odhneria bolognensis*, gen. et sp. n. M. Baer also obtained his material from grass-snakes (*Tropidonotus natrix*) from Northern Italy, but whereas our examples came from Tuscany, on the Western side of the Apennines, his were collected at or near Bologna, on the Eastern side of the same mountains.

The generic name *Odhneria* is preoccupied, having been used by Travassos ‡ for another Trematode. In the circumstances, therefore, it appears that our name *Encyclometra* must stand for the new genus. As regards the specific name, in view of the fact that the date printed on the cover of 'Parasitology' is "31 January, 1924," while that on the cover of the *Annals and Mag. of Nat. Hist.* is "February 1924," we are prepared to cede priority to M. Baer, and propose to regard *Encyclometra bolognensis* (Baer) as the correct name of the species, with *natricis* as a synonym.

There are certain discrepancies between the descriptions, particularly in the measurements of the oral and ventral suckers and of the pharynx. We pointed these out to M. Baer, who agrees (in a letter) that the measurements given by him for these organs were miscalculated, and also that the scale shown by the side of his figure (for which he was not responsible) is not quite accurate. M. Baer states that, on re-examining his specimens, he finds that they agree in the measurements in question with our description. The slight differences between the two sets of measurements of

* *Ann. & Mag. Nat. Hist.* (9) xiii. p. 194 (1924).

† 'Parasitology,' xvi. 1, p. 22.

‡ *Arch. Esc. Sup. Agric. e Med. Vet.*, Nictheroy, v. 1 & 2, p. 64 (1921).

the entire animal, and between those of the testes and ovary, may be readily accounted for (1) by supposing that the specimens examined by M. Baer were probably rather more mature than ours, and (2) by the fact that, as M. Baer states, his measurements were taken from the living animals, while our specimens had been fixed by a somewhat rough method, for class purposes, under cover-glass pressure, and were stained and mounted in balsam before being examined.

The length of the œsophagus is probably subject to much variation. In our description we stated that an œsophagus was absent, the gut bifurcating immediately behind the pharynx. The œsophagus, at all events, is so much reduced in our specimens as to give this impression, but this may, of course, be a result of contraction. Œsophageal glands, although not mentioned in our description, are present in our material as in M. Baer's.

The condition of the yolk-glands, which, according to M. Baer, are somewhat sparse, is very variable. In some specimens the follicles are so close together as to give the appearance indicated in our figure, while in others (probably less contracted) they are more widely separated, as in M. Baer's figure.

It is not our intention to criticize M. Baer's classification of the family Lepodermatidæ. He has arrived at the same conclusion as our own as to the position of the species under discussion, viz., that it represents a new genus with somewhat aberrant characters which render its precise relationships rather obscure. But we would point out that in the generic diagnosis of *Odhneria*, Baer, scarcely sufficient stress has been laid upon the feature that seems to us the most remarkable—namely, the fact that neither the ascending nor the descending limb of the uterus passes between the testes. The typical arrangement of the uterus, with both limbs passing between the testes, is included by M. Baer in his emended diagnosis of the family Lepodermatidæ, but the statement in both generic and family diagnoses that the uterus of *Odhneria* passes "behind" the testes seems to us somewhat ambiguous. Presumably, as the figure indicates, the word "behind" means "dorsally to," but in the main the sinuous ascending and descending limbs lie, as we have stated, laterally to the testes.

BIBLIOGRAPHICAL NOTICE.

BEEBE, WILLIAM. *Galápagos: World's End*. With 24 coloured illustrations by Isabel Cooper, and 83 photographs mostly by John Tee-Van. Published under the Auspices of the New York Zoological Society. G. P. Putnam's Sons, New York and London, 1924. Imp. 8vo, pp. xxi, 443. Price £2 2s.

THIS handsome volume relates the adventures of a party of "twelve" (fourteen being named) on an expedition financed by Harrison Williams to and from the Galápagos Islands, a group of sixty volcanic islands, for ever memorable for the stay of five weeks by Charles Darwin whilst on board H.M.S. 'Beagle' in 1834, and where the first ideas which were published in 1858 in his 'Origin of Species' took their earliest shape. The party left New York on the 1st March, 1923, in the steam-yacht 'Noma,' and returned on the 16th May, having steamed 9000 miles and crossed the equator eight times. Passing through the Panama Canal, the yacht made land at the large island of the group (Indefatigable Island) and began the acquisition of specimens in a state of hustle for the American Museum, though most of the short time available—less than one hundred hours on land—was spent on the smaller islets (Eden, Guy Fawkes, Daphne, Seymour, and Tower), as more remunerative.

Soon the want of water made itself felt. The indications on the charts were found to be fallacious till the expedition reached Tagus Cove, on the largest island (Albemarle), where abundance was found.

The 'Noma' then steamed to Panama to re-coal and take in a fresh supply of water, returning in ten days' time, and the diligent collecting was resumed, until the vessel steered her course homeward on the 29th April, 1923, with an accumulation of specimens which were to be worked up by specialists. Six months after reaching home twenty-two scientific papers were published or were nearing completion in 'Zoologica,' the scientific publication of the New York Zoological Society. Amongst the spoils of the expedition were 3000 insects, 150 reptiles, including the giant lizards and tortoises peculiar to the Galápagos, many of great age. The narrative closes with an account of former visitors from 1516 onwards to the present expedition, and a bibliography of the various narratives, with two indexes of the species observed and taken. The whole work is introduced by an Introduction by Prof. H. F. Osborn and a Preface by the annalist. The various illustrations, many of which are coloured, afford an admirable presentation of this unique group of equatorial islands.

B. D. J.

THE ANNALS
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[NINTH SERIES.]

No. 78. JUNE 1924.

LXXI.—*New or little-known Tipulidæ (Diptera).*—XXIII.
Australasian Species. By CHARLES P. ALEXANDER, Ph.D.,
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Massachusetts, U.S.A.

THE new species described in the present instalment are all from New Zealand, where they were collected in the North Island by Mr. Thomas R. Harris, in the South Island by Messrs. Gourlay, Harris, Howes, and Tapley, and in Stewart Island by Mr. Norman J. Jensen. My deep thanks are extended to all of the above-mentioned students for the privilege of retaining the type-specimens of the species described.

Dicranomyia (Zelandoglochina) paradisea circumcincta,
subsp. n.

Male.—Length 8·9 mm.; wing 8·8–9·5 mm. 1

Generally similar to the typical form, differing as follows:—

Mesonotal præscutum with the median stripe darker and more conspicuous; acutal lobes darkened; postnotal mediotergite blackened medially. Legs with the fore femora extensively infuscated near mid-length, the base and a post-medial ring obscure brownish yellow; a nearly terminal, conspicuous black ring; tibiæ and tarsi brown. On the

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other legs the femora are less conspicuously darkened. Wings with the pattern more extensive, the apex narrowly seamed with brown; vein *Cu* in cell *M* with a conspicuous seam, as in *D. cubitalis*. Venation: *Sc*₁ ending a short distance beyond the origin of *Rs*, *Sc*₂ beyond this origin and not far from the tip of *Sc*₁. Male hypopygium with the notch of the tergite small, semicircular. Mesal lobe of basistyle relatively slender, not strongly infuscated. Rostrum of ventral dististyle long and slender.

Hab. New Zealand (North Island).

Holotype, ♂, summit of Raetihi Hill, Ohakune, altitude 2800 feet, November 20, 1923 (*T. R. Harris*).

Paratopotypes, 5 ♂♂, November 20–30, 1923 (*T. R. Harris*).

The dark seam along vein *Cu* suggests the much smaller and otherwise very different *D. (Z.) cubitalis*, Edwards.

Dicranomyia primitiva, sp. n.

General coloration dark brown; legs brownish black; wings creamy, the ground-colour almost concealed by an extensive brown pattern; male hypopygium with the rostrum of ventral dististyle bearing a single weak spine.

Male.—Length about 6.5 mm.; wing 8.5 mm.

Rostrum moderately elongate, about one-half the length of the head, dark brown, the palpi concolorous. Antennæ black throughout, the incisures of the segments very indistinctly paler; flagellar segments short-oval. Head dark brown, very sparsely and indistinctly pruinose.

Mesonotum dark brown, the præscutum with three very faintly indicated, slightly darker brown stripes. Pleura dark brown, the postnotum with a somewhat paler pollen. Halteres relatively short, pale, the knobs infuscated. Legs with the coxæ and trochanters dark brown, the posterior coxæ a little pollinose; remainder of legs brownish black. Wings cream-coloured, with a very extensive diffuse brown pattern that restricts the ground-colour to areas before and beyond the origin of *Rs*, beyond the stigma, and less distinctly in the posterior and anal cells; veins darker brown. Venation: *Sc* relatively short, *Sc*₁ ending a short distance beyond the origin of *Rs*, *Sc*₂ apparently at the tip of *Sc*₁; *r* elongate, extended, the cephalic two-thirds with macrotrichia; cell 1st *M*₂ rectangular, a little shorter than *M*₁₊₂, beyond it; basal deflection of *Cu*₁ a short distance before the fork of *M*.

Abdomen dark brown, the disk of the tergite a little

paler; hypopygium dark. Male hypopygium with the basistyles relatively stout, the mesal face with a stout hemispherical lobe, together with a smaller lobule. Ventral dististyle fleshy, the apex prolonged caudad as a stout fleshy lobe, the rostrum unusually stout, bearing a single weak spine before mid-length. Dorsal dististyle a relatively short, almost straight rod, the apex suddenly narrowed, acute. Gonapophyses with the mesal apical angle produced caudad into a long slender rod, the blunt tips a little blackened. *Ædeagus* stout, the base setiferous.

Hab. New Zealand (South Island).

Holotype, ♂, Pipeline between Dunedin and Waitati, Otago, September 21, 1923 (*W. Geo. Howes*).

The species apparently belongs to the *fasciata* group.

Dicranomyia subfasciata, sp. n.

General coloration ochreous, the posterior sclerites of the mesonotum largely dark brown; rostrum moderately elongate; antennæ black throughout; wings with a dark brown stigma and a broad diffuse greyish-brown cloud along the cord.

Male.—Length about 5.5 mm.; wing 6.5–6.8 mm.

Female.—Length 6–6.3 mm.; wing 6.5 mm.

Rostrum slender, nearly as long as the remainder of the head, brown; palpi black. Antennæ black throughout, the flagellar segments oval. Head dark brownish grey.

Pronotum ochreous yellow. Mesonotal præscutum bright ochreous to obscure fulvous, indistinctly marked behind with darker in some specimens; a narrow median line on the scutum and on the anterior portion of the scutellum pale, the remainder of these sclerites dark brown; postnotal mediotergite dark brown anteriorly, paler behind. Pleura ochreous yellow to fulvous. Halteres pale basally, the knobs dark brown. Legs with the coxæ and trochanters ochreous, more or less tinged with greenish in some specimens; remainder of the legs dark brown to brownish black, the femoral bases somewhat paler. Wings with a pale brownish tinge, cells *C* and *Sc* a trifle darker, the prearcular region paler; stigma very conspicuous, dark brown, sparsely setiferous, oval; a broad and conspicuous but diffuse greyish-brown cloud along the cord and in the outer end of cell *Cu*₁; outer end of cell 1st *M*₂ narrowly seamed with the same colour; wing-tip and anal margin vaguely clouded with grey; veins black, the prearcular veins paler, yellowish. Macrotrichia of veins relatively long and conspicuous. Venation: *Sc*₁ ending opposite or just before the origin of

Rs, *Sc*, a distance from its tip about equal to one-half *Rs*; *Rs* weakly angulated and sometimes short-spurred at origin; *r* at extreme tip of *R*₁, arcuated, the cephalic half with macrotrichiæ; *R*₄₊₅ weakly angulated, a little more than one-half the sector; cell 1st *M*₂ large, rectangular, subequal to vein *M*₁₊₂ beyond it; basal deflection of *Cu*₁ at or a short distance beyond the fork of *M*.

Abdominal tergites uniformly dark brown, the sternites more yellowish brown; hypopygium blackened. Male hypopygium with the basistyles relatively large, the mesal lobe conspicuous, with long setæ. Ventral dististyle fleshy, with a long, nearly straight rostrum that narrows to the apex, the two spines borne on a conspicuous common tubercle before mid-length, one spine at the apex, the other on the dorsal face of the tubercle near the base; a large fleshy lobe on face of style at base of rostrum; dorsal dististyle heavily chitinized, nearly straight, weakly dilated before the acute, slightly decurved apex. Gonapophyses blackened, the mesal lobes appearing as acutely pointed, spinous blades. Ovipositor with long, slender, and relatively straight valves.

Hab. New Zealand (North Island).

Holotype, ♂, summit of Raetihi Hill, Ohakune, altitude 2800 feet, November 20, 1923 (*T. R. Harris*).

Allotopotype, ♀, November 30, 1923.

Paratopotypes, 2 ♂♂, November 20–30, 1923.

Dicranomyia semicuneata, sp. n.

General coloration brownish yellow; rostrum elongate; antennæ black throughout; halteres elongate; wings subcuneiform, greyish brown; *Sc*₁ ending shortly beyond the origin of *Rs*; inner end of cell 1st *M*₂ not conspicuously pointed; male hypopygium with the spines of the rostrum relatively short, basal in position.

Male.—Length 4.5 mm.; wing 5 mm.

Female.—Length 4.6–4.8 mm.; wing 5.5–5.8 mm.

Rostrum nearly as long as the remainder of the head, black, including the palpi. Antennæ black throughout, the flagellar segments oval. Head black, very sparsely dusted with grey.

Pronotum brown. Mesonotum light brownish yellow, the humeral region of the præscutum brighter yellow; postnotum with anterior half infuscated. Pleura obscure yellow. Halteres elongate, dark brown, only the entire base slightly brighter. Legs with the coxæ and trochanters yellow; remainder of the legs black. Wings with a uniform greyish-brown tinge, the stigma oval, very slightly darker than the

ground-colour, the margin delimited by a pale line; veins slightly darker brown. Wings subcuneiform, but not so marked as in *D. cuneipennis*, Alexander. Venation: Sc_1 ending a short distance beyond the origin of R_s , this slightly variable, in some cases as much as one-fourth the length of the latter, Sc_2 slightly before the origin; Sc_1 alone nearly equal to or longer than the basal deflection of Cu_1 ; R_s long, more than twice the basal deflection of R_{4+5} ; cell 1st M_2 subquadrate, the inner end not or scarcely pointed; basal deflection of Cu_1 just before to just beyond the fork of M .

Abdomen dark brown, the basal sternites a little paler. Male hypopygium with the mesal lobe of the basistyle conspicuous. Ventral dististyle with a long, slender, slightly decurved rod, the two spines shorter than the rostrum and located at its base, arising from small, slightly unequal papillæ; dorsal dististyle gently curved, the tip acute. Gonapophyses with the mesal lobes long and slender, gently curved, the lateral margin with microscopic spicules. *Ædeagus* slightly bifid at apex.

Hab. New Zealand (North Island).

Holotype, ♂, summit of Raetihi Hill, Ohakune, altitude 2800 feet, November 30, 1923 (*T. R. Harris*).

Allotopotype, ♀.

Paratopotype, 4 ♂ ♀, November 20–30, 1923.

Dicranomyia pictithorax, Alexander, *argentifera*, subsp. n.

Generally similar to the typical form, differing conspicuously in coloration. Rostrum fully as long as the remainder of the head, black, including the palpi. Antennæ black throughout, the flagellar segments subglobular to short-oval. Head black, the orbits narrowly and indistinctly grey. Mesonotal præscutum dull black with the interspaces conspicuously silvery white, the median black stripe much broader than in *pictithorax*, slightly widened behind; viewed laterally, the silvery coloration is scarcely apparent; scutal lobes dull velvety black, only the capillary median area pale; scutellum dull black; postnotum black. Black pleural stripe broader; sternopleurite infuscated ventrally. Halteres black, the base of the stem pale. Wings of the type badly damaged; Sc_1 ending opposite the origin of R_s ; r just before mid-length of R_{2+3} . Abdomen dark brown.

Hab. New Zealand (South Island, Stewart Island).

Holotype, ♀, Greymouth, Coal Creek Track, Westland, February 13, 1923 (*T. R. Harris*).

Paratype, ♀, Half-moon Bay, Stewart Island, altitude 110 feet, November 20, 1923 (*N. J. Jensen*).

Molophilus longiclavus, sp. n.

Belongs to the *quadrifidus* group; allied to *M. imberbis*, Alexander; wings pale brown, the veins darker brown; vein *2nd A* elongate; male hypopygium with the basal dististyle a long, nearly straight rod, the distal half more dilated and provided with densely set spinous setæ.

Male.—Length about 4.5 mm.; wing 5.8 mm.

Rostrum and palpi dark brown. Antennæ elongate, nearly as long as the body, as in the group; scape brownish testaceous, flagellum dark brown, the segments fusiform with the terminal pedicel of each segment about one-half the basal enlargement. Head greyish brown.

Mesonotum uniformly brown, very sparingly dusted, the humeral region restrictedly paler. Pleura dark brown. Halteres pale brown, the extreme base of the stem paler. Legs with the coxæ and trochanters testaceous; femora and tibiæ brown, clothed with dark setæ; tarsi dark brown. Wings with a pale brown tinge, the stigmal region very indistinctly darker; veins dark brown. Venation: petiole of cell R_4 about three times $r-m$; basal section of M_3 about equal to $r-m$; vein *2nd A* ending about opposite one-third the length of the petiole of cell M_3 .

Abdomen dark brown. Male hypopygium with the basal dististyle as in the group; a very long, relatively straight and slender rod, the basal half more slender than the distal flattened club, the latter with the apex and mesal edge densely set with appressed spines and spinous setæ.

Hab. New Zealand (Stewart Island).

Holotype, ♂, Half-moon Bay, altitude 50 feet, November 1, 1923 (N. J. Jensen).

Molophilus pullatus, sp. n.

Belongs to the *terminans* group; allied to *M. oliveri*, Alexander.

Male.—Length about 4 mm.; wing 5 mm.

Allied to *M. oliveri*, from which it differs chiefly in the structure of the hypopygium. Male hypopygium with the lateral dististyle slender, curved near mid-length, the apex dilated into a rather abrupt and conspicuous knob, the apex nearly pointed; at the base of the knob with an appressed spine (as in *M. lindsayi*, Alexander). Inner dististyle with the basal blade-like portion relatively narrow, the distal half suddenly narrowed into a neck, the terminal half cylindrical and very gradually narrowed to the long acute

tip, the narrowed portion of the style with a linear row of five microscopic spinules.

Hab. New Zealand (North Island).

Holotype, ♂, Taumarunui, November 19, 1923 (*T. R. Harris*).

Molophilus hexacanthus, sp. n.

General coloration sulphur-yellow; mesonotum orange-fulvous, margined with yellow; knobs of halteres yellow; wings uniformly light yellow; basistyles of male hypopygium each bearing three long spines along the lateral margin.

Male.—Length about 3 mm.; wing 4 mm.

Rostrum obscure yellow, palpi black. Antennæ short, the scape and basal flagellar segments yellowish testaceous, the remaining flagellar segments pale brown, oval. Head sulphur-yellow.

Pronotum sulphur-yellow. Mesonotum light orange-fulvous, the humeral region of the præscutum and the lateral margins of the præcutum and scutum sulphur-yellow; remainder of mesonotum yellowish fulvous. Pleura yellow with a more or less distinct longitudinal brownish stripe extending from the cervical sclerites to beneath the wing-root. Halteres testaceous, the knobs sulphur-yellow. Legs with the coxæ and trochanters yellowish testaceous; femora brownish yellow; tibiæ concolorous, the tips slightly darker; tarsi pale brown, the terminal segments dark brown. Wings with a uniform light yellow tinge, the veins slightly darker yellow; macrotrichæ pale brownish yellow. Venation: vein *2nd A* relatively long, ending about opposite one-fifth the length of the petiole of cell *M*₁.

Abdomen pale brownish yellow, the hypopygium brighter. Male hypopygium with each basal dististyle a straight powerful chitinized rod, bearing three long spines, directed laterad, along the outer margin; basal spine shorter (on one style shorter than on the opposite side) and emerging just beyond mid-length; terminal spine borne immediately before the microscopic spinous apex, a little more slender than the intermediate spine. Outer dististyle bifid as in the group, the mesal arm blunt.

Hab. New Zealand (North Island).

Holotype, ♂, summit of Rætihi Hill, Ohakune, altitude 2800 feet, November 20, 1923 (*T. R. Harris*).

Molophilus sylvicolus, sp. n.

General coloration pale fulvous-yellow; wings tinged with yellow; vein *2nd A* long; male hypopygium with the basal

dististyle a straight broad-based rod, tapering to the subacute apex, the apical half blackened and with microscopic appressed spinulæ.

Male.—Length about 3.5 mm.; wing 4.2–4.5 mm.

Female.—Length about 5 mm.; wing 5 mm.

Rostrum yellowish testaceous, the palpi dark brown. Antennæ short, the scape sulphur-yellow, the flagellum dark brown. Head sulphur-yellow, slightly darker behind.

Mesonotum and pleura uniformly pale fulvous-yellow, the humeral region and narrow lateral margins of the præscutum and the dorso-pleural membranes sulphur-yellow. Halteres pale, the knobs sulphur-yellow. Legs with the coxæ and trochanters yellowish testaceous; femora yellow; tibiæ brownish yellow; tarsi pale brown. Wings with a pale yellowish tinge, the veins a little darker yellow; macrotrichia pale brown; wings narrower than in *M. analis*, Alexander. Venation: vein 2nd A long, ending opposite or just beyond mid-length of the petiole of cell M_3 .

Abdominal segments pale yellowish brown, the caudal margins of the segments narrowly brighter yellow. Male hypopygium with the apex of the basistyle produced into a slender, decurved, blackened beak. Basal dististyle a straight broad-based rod that tapers rapidly to the narrow subacute tip, the style blackened on approximately the distal half, the surface with microscopic appressed spinulæ that continue basad to near mid-length. Outer dististyle bifid as in the group.

The females have the thorax more uniform fulvous than described for the males, and the antennal scape is less brightly coloured.

Hab. New Zealand (North Island).

Holotype, ♂, Karioi, Wellington, in beech forest, November 7, 1928 (T. R. Harris).

Allotopotype, ♀.

Paratopotype, 1 ♂, 1 ♀.

Molophilus jenseni, sp. n.

General coloration fulvous-yellow; wings tinged with pale yellow; male hypopygium with the beak of the basistyle very deep; basal dististyle bispinous; ninth tergite with a median chitinated furcula.

Male.—Length about 2.8 mm.; wing 3.7–4 mm.

Female.—Length about 3.3–3.5 mm.; wing 4.6 mm.

Rostrum yellow, the palpi dark brown. Antennæ short, the scapal segments yellow, the flagellar segments passing

into a testaceous-brown; flagellar segments oval. Head sulphur-yellow in front, infuscated behind and on the genæ.

Mesonotum uniform fulvous-yellow, unmarked, the lateral margins of the præscutum narrowly sulphur-yellow. Pleura obscure fulvous-yellow. Halteres pale, with yellowish-orange knobs. Legs with the coxæ and trochanters yellowish testaceous; remainder of the legs yellow, the terminal tarsal segments passing into brownish black; fore tibiæ of male with a basal, slightly dilated ring, as in the group. Wings tinged with pale yellow, veins pale, *Sc*, *R*, and *Cu* more yellowish; macrotrichia pale brown. Venation: vein 2nd *A* ending just beyond the origin of the petiole of cell *M*₃.

Abdomen brownish yellow, the terminal segments and hypopygium brighter-coloured. Male hypopygium with the apical beak of the basistyle extremely deep, blackened, approximately as broad as long. Basal dististyle a powerful black rod, gently dilated near mid-length, the apex produced into an acute spine, at its base bearing a smaller and more slender acute spine. Outer dististyle feebly bifid. Ninth tergite with a very conspicuous black median furcula, the arms gently diverging.

Hab. New Zealand (Stewart Island).

Holotype, ♂, Half-moon Bay, altitude 80 feet, October 26, 1923 (*N. J. Jensen*).

Allotopotype, ♀, October 31, 1923.

Paratopotypes, 22 ♂ ♀. October 26–November 20, 1923, altitudes 80–110 feet (*N. J. Jensen*).

This very distinct fly is named in honour of the collector, Mr. Norman J. Jensen, to whom I am indebted for many interesting Tipulidæ from Stewart Island.

Amphineurus (Nothormosia) meridionalis, sp. n.

Allied to *A. (N.) harrisi*, Alexander, differing conspicuously in the structure of the male hypopygium; gonapophyses fused with the ædeagus, beyond mid-length breaking away as slender blackened rods, directed laterad, the apex of each terminating in several large and smaller spines.

Male.—Length about 5 mm.; wing 7 mm.

Rostrum pale brown, the elongate palpi black. Antennæ elongate, approximately as long as the body, the scapal segments brownish yellow, the basal flagellar segment brownish testaceous; remaining flagellar segments passing into uniform dark brown; all flagellar segments elongate-fusiform, with conspicuous erect setæ. Head greyish brown.

Mesonotum rather uniformly light brown, the præscutal interspaces a little darkened and provided with black setæ and setigerous punctures; scutal lobes, scutellum, and postnotum weakly infuscated. Pleura brownish testaceous. Halteres pale, the knobs slightly infuscated. Legs with the coxæ and trochanters pale brownish testaceous; remainder of legs broken. Wings with a brownish-yellow tinge; *r* and *Cu* narrowly seamed with pale brown; veins dark brown. Venation: almost as in *A. harrisi*; basal deflection of *Cu*₁ approximately one-half its length before the fork of *M*.

Abdomen uniformly brown. Male hypopygium somewhat as in *A. harrisi*, differing conspicuously in the details of structure. Tergite heavily blackened, terminating in two broad-based spines, without lateral shoulders, the notch between V-shaped. Basistyles produced into moderately long terminal lobes, the mesal face at apex closely set with abundant black spinules. Outer dististyle with the base slender, dilated into an asymmetrical blade, the lateral angle of which is further produced caudad into a slender, gently curved apical lobe that is about equal in length to the base of the style; inner dististyle very short and compact, each with two appressed black spines (thumbs), the base at the caudal-lateral angle with a small, erect, black spine. Gonapophyses united basally with ædeagus, beyond mid-length projecting laterad as slender, blackened rods, the apex of each terminating in a powerful blackened spine with several smaller subterminal spines.

Hab. New Zealand (Stewart Island).

Holotype, ♂. Half-moon Bay, altitude 90 feet, November 6, 1923 (*N. J. Jensen*).

Amphineurus (Amphineurus) stewartiæ, sp. n.

General coloration dark brown, the coloration almost concealed by dense white setæ and scales; antennæ of male approximately as long as the body, the flagellum black.

Male.—Length about 5.5–6.5 mm.; wing 6.2–6.8 mm.; antenna 6–6.5 mm.

Rostrum and palpi black, the second scapal segment fulvous, the incisures of the basal flagellar segments indistinctly paler; antennæ elongate, approximately as long as the body. Head dark brown, with dense white setæ.

Mesonotum dark brown with dense white setæ, the humeral region of the præscutum brighter; pseudosutural foveæ elongate, black. Pleura dark brown, the ground-colour almost concealed by the long, dense, white setæ.

Halteres brown, the base of the stem, and the knobs clothed with long, pale, silken setæ. Legs with the coxæ dark brown; trochanters brownish yellow; remainder of the legs obscure yellow, the colour virtually concealed by abundant, appressed, dark setæ, the tarsi passing into brownish black at tips. Wings tinged with yellowish, the costal region more suffused, the ground-colour almost concealed by dense brown macrotrichiæ; stigmal region a little darker; veins brownish yellow. Venation: R_s rectangular and spurred at origin; cell R_2 sessile, the basal deflection of R_{2+3} angulated, a little longer than r , which is about equal to the petiole of cell R_4 ; cell 1st M_2 very small, rectangular.

Abdomen dark brown, the surface with dense white setæ and scales; hypopygium paler brown. Male hypopygium with the basistyles produced into long, attenuate, pale-tipped lobes. Basal dististyle with the apical third dilated into a small blade which is blackened and serrulate, the apex prolonged into a powerful spine. Both arms of outer dististyle bifid at apices. Gonapophyses lyriform, the apical portion of each gently sinuous, the long acute tips blackened.

Hab. New Zealand (Stewart Island).

Holotype, ♂, Half-moon Bay, altitude 80 feet, October 28, 1923 (*N. J. Jensen*).

Paratopotypes, 3 ♂ ♂, November 1, 1923, altitude 50 feet; 1 ♂, November 17, 1923, altitude 100 feet (*N. J. Jensen*).

Amphineurus (Amphineurus) perarmatus, sp. n.

Size large (wing, male, over 8 mm.); antennæ nearly as long as the body, scapal segments yellow; basal flagellar segments bicolorous; wings with a yellowish tinge; male hypopygium with the gonapophyses bearing a conspicuous spine on mesal face beyond mid-length.

Male.—Length about 7.5 mm.; wing 8.8 mm.

Rostrum and palpi black. Antennæ very long, nearly equal in length to the body; basal segment of scape brownish yellow; second segment light yellow; flagellar segments bicolorous, the basal swelling of each with a conspicuous black ring, the remainder obscure yellow; near mid-length, the flagellum passes into a uniform brownish black. Head dark grey with conspicuous white flattened setæ.

Pronotum obscure yellow. Mesonotal præscutum clove-brown, the humeral region surrounding the elongate pseudo-sutural foveæ brighter, more ochreous; scutal lobes and postnotum dark brown, the scutellum paler. Pleura dark brown, clothed with conspicuous white setæ. Halteres

obscure yellow, the knobs weakly infuscated. Legs with the coxæ infuscated, especially the posterior coxæ; trochanters yellow; femora yellow, clothed with dark setæ, the tips narrowly and weakly infuscated; tibiæ and tarsi yellow, with black scaly setæ that obscure the ground-colour. Wings with a yellowish tinge, the costal region a little more suffused; wing-margin a little darker, brownish yellow, than the centre of the disk; stigma darker brown; veins brownish yellow; macrotrichiae of wings mostly dark-coloured. Venation: cell R_3 sessile or short-petiolate; r about its own length beyond the origin of R_2 ; cell 1st M_2 relatively small and narrow, m less than one-half the outer deflection of M_3 ; basal deflection of Cu_1 more than one-half its length beyond the fork of M .

Abdomen dark brown, the basal sternites paler; surface of abdomen with abundant white setæ. Male hypopygium with the armature unusually developed. Basistyles with the apical lobes relatively short, not attenuated. Basal dististyle a narrow yellow blade, strongly curved to the long, straight, apical black spine. Both arms of outer dististyle simple. Gonapophyses slender, the two together appearing sublyriform, the apical half blackened, just beyond mid-length on mesal face produced into a long black spine that is about one-half as long as the straight black apex. What appears to be part of the ædeagal complex is a conspicuous T-shaped rod, the cross-bar terminating in acute black tips.

Hab. New Zealand (South Island).

Holotype, ♂, Waitati, Otago, November 26, 1923 (*W. Geo. Howes*).

Gonomyia (Lipophleps) banksiana, sp. n.

Wings with a strong brownish tinge; Sc_1 nearly as long as the basal deflection of Cu_1 ; Rs shorter than R_{2+3} ; outer dististyle of male hypopygium terminating in a broad-based spine.

Male.—Length about 4 mm.; wing 4.7 mm.

Female.—Length about 6 mm.; wing 6.2 mm.

Rostrum light reddish orange, very conspicuous, the palpi black. Antennæ black throughout. Head strongly infuscated, the centre of the vertex more yellowish, the anterior part passing into orange.

Pronotum and margins of mesonotal præscutum sulphur-yellow, the disk of the præscutum and the scutal lobes brown; scutellum and postnotal mediotergite yellowish. Pleura yellow with a narrow but very conspicuous dark brown dorsal stripe extending from the cervical sclerites to

the base of the halter; sternopleurite and meron more reddish. Halteres dark brown, the apices of the knobs a little paler. Legs with the coxæ and trochanters yellowish testaceous; remainder of the legs dark brown, the femoral bases a little paler. Wings with a strong brownish tinge, the stigma ill-defined and only a little darker than the ground-colour; veins dark brown. Venation: Sc_1 ending opposite the origin of R_s , Sc_2 some distance from its tip; Sc_1 alone nearly as long as the basal deflection of Cu_1 ; R_s much shorter than R_{2+3} ; cell 1st M_2 relatively short, its inner end about as long as m ; basal deflection of Cu_1 at the fork of M .

Abdomen with the tergites dark brown, the caudal margins of the segments narrowly obscure yellow; sternites reddish yellow, the margins as in the tergites. Male hypopygium with the fleshy prolongations of the basistyles very stout; outer dististyle relatively small, the apex a broad-based black spine; fleshy dististyle a little shorter, setiferous, the apex with a powerful seta.

Hub. New Zealand (South Island).

Holotype, ♂, Governor's Bay, Banks Peninsula, Canterbury, October 19, 1923 (*J. F. Topley*).

Allotopotype, ♀.

"Sweeping *Fuchsia* shrubs in moist situations."

Gonomyia (Lipophleps) circumcincta, sp. n.

Pleura with a dark brown longitudinal stripe that passes across the caudal margin of the postnotum, completely encircling the body; wings with Sc_2 at the extreme tip of Sc_1 ; male hypopygium with the dististyles symmetrical, the outer one relatively long and slender, terminating in an acute spine.

Male.—Length about 4.2 mm.; wing 5.2 mm.

Rostrum brownish yellow, the palpi black. Antennæ black throughout. Head obscure yellow, the vertex darker behind.

Pronotum sulphur-yellow. Mesonotal præscutum brown, the lateral margins behind the humeri sulphur-yellow; scutum broadly yellow, the lobes marked with dark brown; scutellum bright shiny yellow; postnotum sulphur-yellow with two confluent dark marks behind. Pleura yellow, with a conspicuous but narrow dark brown longitudinal stripe extending from the propleura to the mediotergite of the postnotum, as above described, thus passing completely around the body; sternopleura and meron more reddish

yellow. Halteres black, the apices of the knobs indistinctly brighter. Legs with the coxæ yellow, the trochanters testaceous; remainder of the legs dark brown. Wings with a pale brownish tinge, the stigma vaguely darker; veins darker brown. Venation: Sc_1 ending opposite the origin of R_s , Sc_2 at its extreme tip; R_s strongly angulated at origin, a very little shorter than R_{2+3} .

Abdominal tergites dark brown, the lateral margins paler; sternites yellowish. Male hypopygium with the outer or chitinated dististyle symmetrical as in *G. (L.) banksiana*, sp. n. (asymmetrical in *G. (L.) nigrohalterata*, Edwards, and *G. (L.) longispina*, Alexander). These styli are a very little longer than the stout caudal lobes of the basistyles, relatively long and slender, the apex of each produced into an acute spinous beak, the surface of the style without a conspicuous sub-apical seta (as in *banksiana*).

Hab. New Zealand (North Island).

Holotype, ♂, Taumarunui, December 24, 1922 (*T. R. Harris*).

Gnophomyia harrisiana, sp. n.

General coloration dark brown; legs with the femora yellow, the tips broadly blackened; tips of the tibiæ dark brown; tarsi brownish black; tibiæ with conspicuous erect setæ; wings tinged with brown, the base light yellow; stigma brown; cord narrowly seamed with brown.

Female.—Length about 5–5.4 mm.; wing 5.6–5.8 mm.

Rostrum and palpi black. Antennæ short, black throughout. Head dull black, sparsely pruinose.

Pronotum dark brown or brownish black, brighter posteriorly. Mesonotal præscutum with three confluent black stripes, the humeral region brighter, reddish brown, the lateral margins broadly of the same colour and interrupted by a dark spot opposite anterior ends of the lateral stripes; scutal lobes dark brown; scutellum dark brown, the caudal margin narrowly paler; postnotum dark. Pleura dark brown, the postnotal pleurotergite near the wing-root more reddish. Halteres obscure yellow, the knobs infuscated. Legs with the coxæ and trochanters yellow, the fore and middle coxæ slightly infuscated; femora yellow, the tips broadly and conspicuously blackened; tibiæ obscure yellow, the tips narrowly dark brown; tarsi short, brownish black throughout; tibiæ and tarsi with conspicuous erect setæ. Wings tinged with brown, the prearcular region conspicuously light yellow; cells *C*, *Sc*, and *Sc*₁ yellowish; stigma oval, brown; narrow but conspicuous brown seams along the

cord and outer end of cell 1st M_2 ; a conspicuous yellow suffusion along vein Cu throughout its length; veins darker brown, Cu and the prearcular veins yellowish. Venation: Sc_1 ending opposite three-fourths the length of R_s , Sc_2 near its tip; basal deflection of Cu_1 longer than the fused portion of M_3 and Cu_1 .

Abdomen dark brown, the ovipositor horn-coloured, with the long slender tergal valves slightly upcurved.

Hab. New Zealand (North Island).

Holotype, ♀, Taumarunui, November 19, 1923 (*T. R. Harris*).

Paratopotype, ♀.

This interesting fly is named in honour of the collector, Mr. Thomas R. Harris, to whom we are vastly indebted for invaluable material from the Ohakune District and Tongariro National Park.

Gynoplistia ambulator, sp. n.

Nearly wingless in both sexes; male hypopygium with the outer dististyle bearing a conspicuous blackened tubercle on the outer margin before mid-length.

Male.—Length 10 mm.; wing 2 mm.

Female.—Length 13 mm.; wing 2 mm.

Rostrum grey, the palpi brownish black. Antennæ 16-segmented, the formula being $2+3+8+3$; longest branch about three times as long as the segment that bears it; branch of eleventh flagellar segment shorter than the segment; scapal segments and extreme base of the first flagellar segment reddish brown; remainder of organ black. Head light grey, the centre of vertex infuscated.

Pronotum brown, dusted with grey, with an indistinct median line. Mesonotal præscutum relatively flattened, grey, with three brownish stripes, the median stripe better indicated behind; a brownish tinge at the humeral region; pseudosutural foveæ large, oval, chestnut-brown; remainder of mesonotum grey; scutum and scutellum flattened and united into a single piece. Pleura grey. Halteres ochreous, the knobs infuscated. Legs with the coxæ large, pale, dusted with silvery grey; trochanters obscure yellow; femora brownish yellow, with a faintly indicated narrow subterminal brownish ring; tibiæ brownish yellow, the tips narrowly infuscated; basitarsi brown, the tips and remainder of the tarsi dark brown. Wings reduced to mere rudiments in both sexes, as indicated by the measurements; yellow, the costal region infuscated; veins a little darker than the ground-colour. Venation distorted.

Abdominal tergites reddish brown with an interrupted median brown stripe, the caudal margins of the segments very narrowly obscure yellow; seventh and eighth segments brownish black to form a subterminal ring, the eighth tergite small, largely telescoped beneath the seventh; hypopygium reddish brown. Male hypopygium with the caudal margin of the ninth tergite nearly truncate. Basistyles relatively stout, the interbasal lobe small, slender, smooth, directed cephalad. Outer dististyle pale, the apex roughly truncate, microscopically serrulate, immediately before the apex with one or two small subterminal spines; outer margin before mid-length bearing a tubercle that is more or less produced into a blackened spine, the face of the style opposite this point hollowed out and setiferous; inner dististyle relatively slender, shorter than outer style. Gonapophyses slender, not conspicuously projecting. Aedeagus slender, the decurved apex with the margins weakly serrate.

Hab. New Zealand (South Island).

Holotype, ♂, Riverton Beach, Southland, October 10, 1923 (*W. Geo. Howes*).

Allotopotype, ♀.

Paratopotypes, 7 ♂ ♀.

"Walking about on sandy beach."

The other species of the genus, in which both sexes are nearly apterous, are *Gynoplistia pedestris*, Edwards, and *G. resecta*, Edwards.

Gynoplistia luteicincta, sp. n.

Allied to *G. niveicincta*, Alexander; antennæ 22-segmented, with eighteen branched segments; posterior tibiæ with a conspicuous light yellow ring; wings pale yellow, the base conspicuously light yellow; cell *Sc* dark brown; male hypopygium with the interbasal process terminating in an acute blackened spine.

Male.—Length about 11 mm.; wing 9.2 mm.

Rostrum shiny dark brown, the palpi black. Antennæ 22-segmented, the formula being $2+2+16+2$; terminal segment twice as long as the penultimate and apparently formed by the fusion of two segments; antepenultimate segment with a short subterminal branch; basal branches in spiral alignment, the longest branch being about two-fifths the length of the flagellum; antennæ black, the branches paling into brown. Head black throughout.

Pronotum brown. Mesonotal præscutum with three confluent dark greenish stripes, the humeral region encircling

the large, oval, pale pseudosutural foveæ brownish; remainder of mesonotum, except the pale median area of the scutum and the lateral margins of the scutellum, shiny greenish black. Pleura dark chestnut-brown, the dorso-pleural region dark brown; pteropleurite, hypopleuron, and metapleural katapisternum densely covered with a microscopic grey pubescence. Halteres obscure orange-fulvous. Legs with the coxæ chestnut-brown; trochanters obscure brownish yellow; femora yellow, the tips blackened, the amount proportionally subequal on all the legs, including the terminal third or a little less; remainder of the legs black; posterior tibia with a conspicuous light yellow ring beyond mid-length, this subequal to or a little shorter than the black apex. Wings with a pale yellowish tinge, the base conspicuously light yellow; cells *Sc* and *Sc*₁ uniformly darkened; a conspicuous brown pattern, distributed as follows: at origin of *Rs*; at stigma and anterior cord; narrow brown seams on posterior cord and outer end of cell 1st *M*₂; a very small cloud in cell 1st *A* opposite the origin of *Rs*; wing-tip extensively but indistinctly darkened; veins black, the prearcular veins obscure yellow. No distinct darkening at bases of cells *R* and *M*. Venation: *Sc*₁ ending just beyond the fork of *Rs*, *Sc*₂ near its tip; *R*₁ rectangular at origin, as in the group; veins *R*₂ and *R*₃ conspicuously diverging; cell 1st *M*₂ rectangular; basal deflection of *Cu*₁ just before mid-length.

Abdomen black, with only faint and ill-defined purplish reflexions; hypopygium paler. Male hypopygium with the mesal face of basistyle produced into a flattened, obtusely rounded lobe and a more distal conical knob; apex produced into a conspicuous blade, the apex obliquely truncated, without setæ on the outer fifth. Outer dististyle terminating in a narrow decurved point; inner dististyle distinctly infuscated outwardly. Interbasal process relatively stout, pale, the apex suddenly narrowed into an acute black spine.

Hab. New Zealand (North Island).

Holotype, ♂, Ohakune, altitude 2060 feet, December 12, 1922 (T. R. Harris).

Paratype, ♂, Karioi, Wellington, in beech forest, November 7, 1923 (T. R. Harris).

• *Gynoplistia subformosa*, sp. n.

Allied to *G. formosa*, Hutton; head and antennæ black throughout; mesonotal præscutum shiny chestnut-brown, with three black stripes; posterior tibiæ dark brown with an

ill-defined orange band before the tip; wings pale yellow with a brown pattern, including a dark spot in bases of cells *R* and *M*; male hypopygium with the apices of the basistyles produced into conspicuous truncate blades, the apical fourth of each without setæ.

Male.—Length about 13 mm.; wing 10.5 mm.

Rostrum shiny black, the palpi dull black. Antennæ 21-segmented, the formula being $2+2+13+4$; branches elongate, the longest approximately one-half the flagellum; antennæ black throughout. Head shiny coal-black throughout.

Pronotum black anteriorly, more reddish behind. Mesonotal præscutum obscure shiny chestnut with three black stripes, the pseudosutural foveæ very large, oval in outline; scutum dark brown, the lobes extensively blackened; scutellum shiny brown, the parascutella black; postnotal mediotergite black, the cephalic lateral region paler. Pleura shiny brownish black, the pteropleurite, hypoepimeron, and metapleural katapisternum with microscopic, appressed, grey pubescence. Halteres obscure orange-yellow. Legs with the coxæ dark shiny brown; trochanters obscure orange; femora orange, the tips narrowly infuscated; remainder of legs black, the posterior tibiæ with a broad (more than 2 mm.) ill-delimited orange band beyond mid-length, the setæ on this ring in part dark-coloured. Wings with a pale yellowish tinge, the base and cells *C* and *Sc* brighter yellow; a conspicuous dark brown pattern that includes a large circular area at the origin of *Rs*; a conspicuous mark at stigma and on anterior cord; posterior cord and outer end of cell 1st *M*, narrowly seamed with brown; a conspicuous brown marking in the bases of *R* and *M*; a paler wash in cell 1st *A* opposite the origin of *Rs*; wing-apex very faintly darkened; veins dark brown, paler at the wing-base. Venation: *Sc*₁ ending just before the fork of *Rs*, *Sc*₂ at its tip; *Rs* spurred at origin; *r* about its length from the tip of *R*₁; cell 1st *M*, about equal to the petiole of cell *M*₁; basal deflection of *Cu*₁ more than one-half its length beyond the fork of *M*.

Abdomen shiny brown, the segments darker posteriorly, with conspicuous purplish to violaceous reflexions. Male hypopygium with the basistyle stout, the mesal face of each produced into small lobes, the distal one smaller and with dense black setæ; apex of basistyle produced into a relatively long blade, the apex subtruncate, the surface with conspicuous setæ except on the distal fourth. Outer dististyle

terminating in a slender decurved point; inner dististyle a flattened blade with the apex obtuse. Interbasal process appearing as a flattened blade, tapering gradually to the acute concolorous tips.

Hab. New Zealand (South Island).

Holotype, ♂, Mt. Grey, Canterbury, altitude 500–800 feet, March 1916 (*E. S. Gourlay*).

LXXII.—*Land Mollusca from the Maritime Province of Siberia.* By T. D. A. COCKERELL, University of Colorado.

THE new species will be figured later in 'Proceedings of United States National Museum.' The fauna is wholly Palearctic in character. The species of *Succinea* and *Agriolimax* will be dealt with later.

Helicidae.

EULOTA, Hartmann.

Eulota eulemnisca, sp. n.

Shell-diameter, max. 26, min. 22.5 mm.; alt. 19 mm.

Spire low-conoid; whorls $6\frac{1}{2}$, rounded, the last whorl with very obtuse periphery; nucleus without evident sculpture; surface of shell somewhat shining, the whorls with coarse growth-lines above periphery, and above and below with fine spiral lines; sutures moderately impressed; umbilicus deep and open, with a diameter of about $3\frac{1}{2}$ mm., slightly overlapped on one side by the broad reflected lip; aperture rounded, the lip white, forming approximately $\frac{2}{3}$ of a circle, the lower inner margin with a slight rib; colour very pale yellowish (cream-colour), slightly flushed with red behind the aperture below the periphery; a strong dark brown band, nearly 2 mm. wide, above the periphery; band-formula 00300; umbilical region not darkened.

Low Lighthouse, between Valentine Bay and Olga, coast of Siberia, July 13, 1923. Collected by Mr. A. I. Lavrushin. Found on a bank overlooking the sea.

Intermediate between *E. maackii* and *E. middendorffi*, but quite distinct.

Eulota weyriskii (Schrenck).

Rather common at Okeanskaja, Kongaus, and Olga, in the Maritime Province of Siberia, July–August 1923 (*Cockerell*).

The variety *cinctoinflata* (Mousson), recorded from Vladivostok, appears to differ only in the warm reddish ground colour of the shell; I found this, as well as the ordinary pale form, at Okeanskaja. The differences in the shape of the shell, as shown between the figures of *weyrichii* and *cinctoinflata*, may be partly due to variation, but I think also to the position in which the shell was held for drawing.

Eulota middendorffii (Gerstfeldt).

Common at Okeanskaja and on the Kudia River, July 1923 (Cockerell).

The original types had diameter max. 24, min. 22 mm.; alt. 11–15 mm. Shells from the Kudia River run a little smaller: max. diam. 21–24, min. 17·6–20·5 mm.

The Okeanskaja form is like that of Kudia River. The animal is pale, that of *E. maackii* being dark slate-colour, with the sole dull white, suffused by greyish anteriorly.

Eulota maackii (Gerstfeldt).

The most characteristic large snail of the Maritime Province. I found it common on the Kudia River and at Okeanskaja.

The forms *elator* and *depressor* of Schrenck are merely individual variations.

One shell from the Kudia River is conoidal, diam. max. 31, min. 27 mm.; alt. fully 28 mm. Gerstfeldt, in his original description, said alt. 24 to 30 mm.

Eulota maackii optima, Cockerell, ined.

The large race of *E. maackii* abundant at Kongaus, where the typical form is absent.

Max. diameter 32·5–36·5 mm., usually about 34·5 or 35·5. The typical *maackii* has diam. max. 30 mm.

The form *albida*, Cockerell, ined., has the shell yellowish white without markings. It was found by Mr. A. I. Lavrushin. Schrenck reported *E. ravida*, Benson, from the Amur Province, but this is a species of middle and northern China, and I doubt its occurrence in Siberia. *E. lata* (Gould), which A. Adams reported from Sio-wu-hu Bay (south of Valentine Bay, on the Siberian coast), is a Japanese species. What Adams saw was doubtless *E. weyrichii*. *Euhadra simoda* (Jay), which Adams records from Olga and Vladivostok, was certainly another species, most likely *Eulota middendorffii*, or a mixture of this with *E. maackii*. Adams does not mention these species of Gerstfeldt, which he could hardly have failed to find.

HYGROMIA, RISSO.

Hygromia amatoris, sp. n.

Shell diam., max. 20, min. 17.6 mm. ; alt. 11.3 mm.

Spire obtuse, about as in *H. umbrosa* (Partsch) ; whorls about 6, rounded, the periphery very obtuse ; nucleus without sculpture ; surface of shell dullish, slightly shining, with moderate growth-lines and rather coarse spiral lines ; sutures not much impressed ; umbilicus deep and open, about 3.5 mm. diameter ; aperture oblique, only about 4 mm. wide in middle, sharply bent below the columella ; lip moderate, distinctly reflected in the columellar region ; colour pale straw, entirely without bands or markings, the epidermis thin and readily abraded.

Valentine Bay, coast of Maritime Province, Siberia, July 12, 1923 (*Cockerell*).

Easily known among the species of eastern Siberia by its large size, but in the form of the aperture approaching *H. nordenskioldi*, Westerlund.

Hygromia notophila, sp. n.

Shell diam., max. 13.4, min. 12.3 mm. ; alt. 9 mm., varying to 8 mm.

Spire obtuse, moderately elevated ; whorls about 5½, rounded, the periphery not at all angulate, but last whorl shouldered near aperture ; nucleus without sculpture ; growth-lines very strong above, spiral lines fine and numerous ; surface of shell shining ; sutures rather strongly impressed ; umbilicus wide and deep, about 2.6 mm. diameter ; aperture broad, its outer side flattened, columella oblique ; lip thin, reflected near its junction with base of shell ; colour very pale brown, approaching white, without bands or markings.

Kongaus, Siberia, frequent on a hill overlooking the village, but only a few living specimens found ; August 1923 (*Cockerell*).

Hygromia kudiensis, sp. n.

Shell diam., max. 14, min. 12 mm. ; alt. 7 mm.

Spire obtuse, low ; whorls about 5½, rounded, the last inflated above near aperture ; growth-lines moderate, spiral lines hardly visible ; surface of shell dull ; sutures rather strongly impressed ; umbilicus very wide, perspectival, with diameter at last whorl about 4 mm., varying to less ; aperture oblique, broad, its outer side rounded ; lip moderate ; columella very oblique ; colour pale brown.

Kudia River, Siberia, N. lat. 46°, on side of hill ; only dead shells found, July 1923 (*Cockerell*).

Very like the last, but the shape of the aperture differs, the spire is more depressed, the dull brown surface is distinctive, and the umbilicus is apt to be considerably wider. These shells are in a general way related to *H. nordenskioldi*, Westerlund, which Dr. L. von Schrenck took for *H. rufescens* of authors—i. e., *H. striolata*, C. Pfeiffer. *H. nordenskioldi* is a compact shell, shining, yellowish red, with a pale band.

Hygromia sericea, Draparnaud.

Two other European species—*H. sericea*, Draparnaud, and *H. hispida*, Linnæus—were recorded by von Schrenck from the Amur Valley; but the supposed *sericea* has since been described as *H. stuxbergi*, Westerlund, while the so-called *hispida* consists of *H. verna*, Westerlund, and *H. eutheta*, Westerlund. From the Kudia River I have a denuded and partly broken adult or subadult shell, 8 mm. max. diam., with the aperture forming a portion of a circle, and the umbilicus much narrower than in *H. hispida*. I also have from the same place an immature and broken shell, red-brown with a faintly indicated pale peripheral band, and the surface coarsely hirsute, with long, strongly bent, pale brown hairs. The early whorls are distinctly larger than in *H. hispida*. This certainly has nothing to do with *H. eutheta*, Westerlund, which occurs as near as Nikolaievsk, and has a diameter of 10 mm. (*H. eutheta* is beset with excessively short white hairs and is openly umbilicate). It is also clearly not *H. verna*, Westerlund, which was also referred to *H. hispida* by Schrenck. It may be properly referable to Westerlund's *H. stuxbergi*, but at present I cannot clearly separate it from the European *H. sericea*, Draparnaud, which is often regarded as a race of *H. hispida*. This has nothing to do with *Ashfordia granulata* (Alder), which Jeffreys referred to *H. sericea*. *H. stuxbergi* has not been figured.

VALLONIA, Risso.

Vallonia patens, Reinhardt.

A couple of shells which I found on the Kudia River are of the group of *V. costata*, but only 2 mm. diameter, last whorl with about twenty-four membranous ribs, aperture transversely oval as seen in lateral view, the last whorl before the aperture evidently descending. The lip is quite stout. This is not *V. costata*, var. *amurensis*, Sterki, which I expected it to be, but agrees with the description of *V. patens*

from northern China, about a thousand miles to the southwest. That the region from which *V. patens* came is not altogether different from that of the Kudia River is shown by a certain similarity in the flora—e. g., the occurrence of *Populus suaveolens*, Fischer, which was also abundant at the Vallonia locality on the Kudia River.

Endodontidæ.

GONYODISCUS, Fitzinger.

Gonyodiscus ruderatus (Studer).

Abundant on the Kudia River, at Okeanskaja, and at Kongaus.

Those from the hills (Kongaus) are typical *G. ruderatus*; those from the other two localities (near sea-level) are var. *angulosus* (Mousson), with a more or less evident keel. There is, however, much variation in each locality.

Zonitidæ.

POLITA, Held.

Polita radiatula (Alder).

Kudia River and Kongaus.

These are the true *P. radiatula* (*hammonis* of some authors), not *P. petronella* (Charpentier). On the Kudia River some of the shells are white (var. *albinos*, Moquin-Tandon).

EUCONULUS, Reinhardt.

Euconulus fulvus (Müller).

Kudia River, Kongaus, and Okeanskaja.

These shells seemed peculiar in the very dull upper surface, but, on comparing with English specimens, there is nothing really distinctive.

Cochlicopidæ.

COCHLICOPA, Férussac.

Cochlicopa lubrica (Müller).

Not uncommon at Okeanskaja, Kongaus, and the Kudia River.

One from Okeanskaja has the aperture unusually long and narrow, and may be separable.

LXXIII.—*On a new Species of Rhipidothrips* (*R. kellyanus*, *sp. n.*) from Australia. By RICHARD S. BAGNALL.

IN a recent paper on the genus *Melanothrips* (Ent. Mo. Mag. 3rd ser., x. pp. 1-3) I characterized the family *Æolothripidæ* and the three subfamilies, *Melanothripinæ*, *Æolothripinæ*, and *Orothripinæ*, mihi, all of which are represented in the Australian fauna. The genus *Rhipidothrips* of Uzel is separated from *Æolothrips* by the longer head, which is usually approximately as long as broad or longer, whilst the three last joints of the antennæ are connate instead of four in *Æolothrips*. The species described below might truthfully be said to have the last two antennal joints connate but broadly united to 7, which is substantially longer than 8 and 9 together. Until recently the genus was represented by three European species—*R. graciosus*, Uzel, *R. niveipennis*, Reuter, and *R. brunneus*, Williams,—of which the first- and last-named are known from the South of England. In December, 1918, however, Hood described *R. cinctus* from the coastal region of North Queensland. I am particularly pleased to now describe a second Australian species, and I take the opportunity of dedicating it to Mr. Reginald Kelly, who is doing so much to make known the Thysanopterous fauna of Australia.

It is possible that most, if not all, of the fossil *Æolothripidæ* described by Scudder and others fall in the *Æolothripinæ* (including *Lithadothrips* and *Palæothrips*, should they be maintained as good genera). A recently described species from Baltic amber—*Rhipidothripoides abdominalis*, Bagn.,—differs from *Rhipidothrips* in its transverse head and curiously enlarged ninth abdominal segment.

Rhipidothrips kellyanus, *sp. n.*

♀ (macropterous).—Length about 2.5 mm.

Colour greyish-yellow; head (especially medio-basally) mottled with brown; pronotum and pteronotum more strongly shaded brown; abdomen with segments 9-10 dark blackish-brown, and 2-7 with a more or less oblong median brown patch; legs only very lightly tinged with grey to light grey-brown, and chiefly in the outer margin of the femora. Antennal joints 4-9 black, 1 shaded with deep grey-brown

apically, 2 laterally, and 3 shading from yellowish basally to deep blackish brown, the distal half being practically concolorous with the following joints. Wings light grey, almost white, with a smoky-brown stripe along the lower margin confined by the lower vein and the lower ring-vein and including the scale. Lower fringe smoky-brown.

Head not quite as long as broad, with a transversely striate belt at the hind margin, occiput, and cheeks, which are slightly arched, with several distinct setæ; antennæ more than twice as long as the head, with joints 3 and 4 long, 6 and 7 somewhat closely united, and 7 surmounted by two closely united minute joints. Relative lengths of joints approximately as follows:—

1.	2.	3.	4.	5.	6.	7.	8.	9.
28	42	87	75	45	36	27	8	12

Pronotum transverse, slightly longer than head and 1.5 times as broad as long, set with numerous short dark setæ mostly inwardly and forwardly directed, series on distal margin 20 or more, a few pairs on hind margin only somewhat larger. Mesoseutum closely and transversely striate, with a transverse band of short dark setæ across the middle. Metascutum longitudinally and finely striate at sides, with disc reticulate. Wings and legs of normal structure, setæ on costa and veins of fore wing short, dark, and closely set. Scale with a similar series along fore margin and two long bristles at apex. Abdomen normal, much as in *R. gratiosus*.

Hab. SOUTH AUSTRALIA, Mount Lofty Ranges, April 22, 1923, on *Eucalyptus leucoxydon* (R. Kelly). Two females, one in fragments and having of its appendages but a single fore wing remaining; the head, antennæ, legs, and other wings destroyed.

This species may be separated from all the other species by its large size and type of coloration, and more especially from the other Australian species, *R. cinotus*, Hood, by the colour of the antennæ (joint 4 and the distal half of 3 being wholly dark), the lack of bars across the wings, and the possession of dark marginal area. The long seventh and short eighth and ninth antennal joints are also distinctive, the latter closely approximating the style seen in *Physothrips* and allied genera.

LXXIV.—*A new Short-tailed Opossum from Argentina.*

By OLDFIELD THOMAS.

AMONG some small mammals presented to the National Museum by Mr. Frank Foster, of the Buenos Ayres Western Railway, there is an example of a *Monodelphis* from Caleufú, on that railway, rather more than halfway across towards the Andes. This is an extension of the known range of the genus, which had not hitherto been recorded from west or south of a line drawn from Peru to Montevideo, nor from anywhere in Argentina.

Monodelphis fosteri, sp. n.

Most nearly allied to the S. Uruguay *M. dimidiata*, but of a very much paler grey colour above, near "deep mouse-grey," the sides scarcely more buffy than the back, the belly only faintly tinged with buffy, as is also the case with the cheeks, instead of these parts being in each case strong prominent buffy. Tail bicolor, black above, whitish below.

Skull and teeth as in *dimidiata*.

Dimensions of the type (from a remade skin):—

Head and body 90 mm.; tail 40.

Skull: condylo-basal length 24·5; zygomatic breadth 11·5; nasals 10 × 3·2; interorbital breadth 4·5; maxillary tooth-row 10·5; molars ¹⁻³ 5.

Hab. Caleufú, a station on the Western Railway about 64° 30' W. and 35° 35' S.

Type. Immature female. B.M. no. 24. 4. 5. 1. Collected by a railway employé, 10th April, 1923, and presented by Frank Foster, Esq.

This specimen is just about the same age as a number of *M. dimidiata* which I collected in 1896 near Montevideo, and is conspicuously different in colour from any of them.

I have named the species in honour of Mr. Foster, to whom we owe the donation of a number of small mammals collected by various employés of the Western Railway Company.

LXXV.—*Description of a new Anguid Lizard from Brazil.*

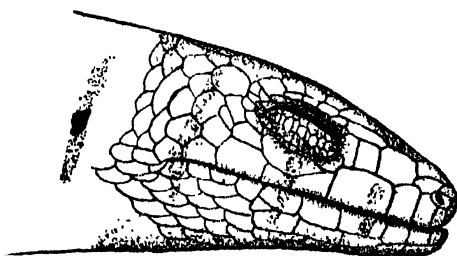
By H. W. PARKER, B.A.

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Diploglossus tenuifasciatus, sp. n.

Lateral teeth with obtuse crowns. Head but little distinct from neck; snout short; canthus rostralis rounded. Ear-opening small, about as large as the first upper labial. A large azygos præfrontal, broader than, and in contact with,

the entire anterior border of the frontal; much broader than long; in contact with the anterior loreal, but separated from the rostral by two pairs of shields—the supranasals and frontonasals; the latter longer than the former. Frontal once and a quarter as long as broad; a pair of frontoparietals in contact with the supraoculars; parietals completely separated by the interparietal and separated from the supraoculars by a large shield; a large occipital. Nasal in contact with rostral, supranasal, first and second labials, and a postnasal. Two consecutive loreals, the first about three times as large as the second. Rostral much broader than mental. The suture between fifth and sixth (or sixth and seventh) supralabials falls below the centre of the eye. A single median anterior, and four pairs of chin-shields present; the median and first pair alone in contact with the lower labials. Body elongate, rounded, slightly depressed. Scales in 35 rows, those on back and sides being finely striated but keelless.



Diploglossus tenuifasciatus, sp. n., $\times 3$.

Limbs short, not meeting when adpressed. Digits short, the claws completely retractile into a large sheath.

Colour.—Above a bluish silver-grey, with narrow transverse black bars, each of which is bordered posteriorly with white. Each bar occupying the width of one scale and separated by an interspace equal to three scales; not extending on to ventral surface. Twenty to twenty-one such bars between tympanum and vent. On the neck and head the black disappears, the bars being indicated by four faint white vertical bars at the sides. Belly and under surfaces of limbs rosy pink in life, fading to yellowish in spirit; throat and under surface of tail yellowish.

Head 16 mm.; snout to vent 105; fore limb 16; hind limb 24.

Described from a single specimen obtained by Mr. Handman from Natal, Rio Grande do Norte, Brazil.

Very closely related to *Diploglossus lessonae* (Peracca), differing in colour-pattern and in having two (instead of three) loreals, five or six (instead of seven) upper labials in advance of the centre of the eye, and one (instead of two) pairs of chin-shields in contact with the lower labials.

LXXVI.—*A new Rivulus from Rio de Janeiro.*

By G. S. MYERS.

FOR the past year or so Mr. Richard Dorn, of Upper Montclair, N.J., U.S.A., has been receiving small shipments of live aquarium fishes from a correspondent in Rio de Janeiro, Brazil. Most have been armoured catfishes (*Corydoras*) and small characins (*Hyphessobrycon bifasciatus* and *Paragoniates microlepis* amongst others). During the first part of January of this year a dozen or so *Rivulus* were included in one of the consignments. I obtained a male and female from Mr. Dorn, and upon examining them I became convinced they were undescribed. Later Mr. Dorn gave me six preserved specimens, and these bore out my conviction.

Rivulus dorni, sp. n.

Diagnosis.—A *Rivulus* with depth 5; head $3\frac{1}{2}$; eye $3\frac{3}{4}$ to 4; scales 28–29 in a lateral series; dorsal $8\frac{1}{2}$ *, inserted over middle of anal; anal $13\frac{1}{2}$ in male, $11\frac{1}{2}$ in female, ending very slightly in advance of end of dorsal; and in which the female has no caudal ocellus.

The type, a female 43 mm. in length to base of caudal, from Rio de Janeiro, December 1923, has dorsal $8\frac{1}{2}$; anal $11\frac{1}{2}$; scales 28/8, about 15 before the dorsal; head $3\frac{3}{4}$ in length, $1\frac{1}{2}$ as long as wide; eye $3\frac{3}{4}$ in head, $1\frac{1}{2}$ in interorbital, once in snout; interorbital $2\frac{1}{2}$ in head, equal to least depth of caudal peduncle. Dorsal inserted over middle of anal, its origin 13.5 mm. from caudal base and 29.5 mm. from snout, and its longest ray (seventh) 7 mm. in length. Anal base ending very slightly in advance of end of dorsal base, its longest ray (tenth) 6.5 mm. long. Pectorals 8 mm. in length, $1\frac{1}{2}$ in head, and not reaching ventrals by $\frac{1}{2}$ their own length. Caudal rays graduated, those in the middle (longest) 12 mm. in length.

Head rather flattened, depressed above, somewhat bulging

* The last ray, split to the base, is counted as $1\frac{1}{2}$.

at the sides. Body slender, depth 5 in length, the anterior part rounded, the posterior part and caudal peduncle compressed. Lips thick, the lower projecting.

Yellowish brown, darker above, belly pale yellow. Each scale with a light spot, this pattern breaking up on the sides above the anal fin where the spots become fewer and scattered. Lower lip and a patch under the eye blackish. Caudal dusky, with small light spots. Posterior parts of the anal and dorsal coloured likewise.

Paratypes seven, four males and three females (one male and one female living in my aquaria), the largest (a female) 52 mm. to base of caudal. Besides the remarkable difference in the number of anal rays mentioned in the diagnosis, the sexes are very unlike in colour. The males have the fins blackish, mottled at the bases, besides the small light spots as in the females' fins. The sides are darker, and above the anal and posteriorly the pattern consists of dark vertical bars, seven or eight in number, the last being on the caudal base.

The two living paratypes show the following colours:—
Female: chocolate-brown, belly yellowish white. Eye brown. A poorly defined blackish spot below eye. Lower lip blackish, under jaw whitish, with no median black blotch. The light scale-spots of the preserved specimens are bright blue-green, these few and scattered above the anal and posteriorly. Median fins light, a little darker at base. A few blue-green spots at base of anal and dorsal. Rest of these fins spotted with small light dots. Caudal likewise spotted, a few of the dots showing greenish. Ventrals yellowish. Pectorals transparent. Male: chocolate-brown, a small area underneath yellowish white. Side of head below level of eye blackish; lower lip the same colour. Underjaw whitish, with a median dark patch. A black spot immediately behind insertion of pectoral, nearly obscured by the dark ground-colour. Beginning with the third scale-row, each scale with a small triangular spot of brilliant blue-green. Above the insertion of the anal these regular rows of spots start to break up, and above the first third of that fin make an irregular vertical bar of blue-green. The next bar is distinct, and after this follow five more, the last on the caudal base. There is another bar out on the caudal, but the one that would follow this breaks up into a vertical series of blue-green spots, these being the light spots mentioned in the description of preserved specimens. There are three or four of these series on the caudal. Anal blue-green, mottled with brown along base, fading to yellowish on the outer part.

The base of the dorsal is dark brown, this being bounded above by an irregular blue-green line. From there outwards the fin is brownish, marked posteriorly with small light spots. Both the caudal and the anal have a dark brown seam around their edges; in the former there is a suggestion of a blue-green edging above and below. Ventrals greenish. Pectorals transparent. Eye brown. Tips of opercles with a blue-green spot.

Rivulus dorni belongs to that group of Regan's key * which contains *isthmensis*, *brasiliensis*, *breviceps*, *balzanii*, and *brevis*. It is distinguished by several characters from all of these, one notable point of difference being the slender body.

The first two anal rays are partially covered by a membrane, and are hard to discern. The predorsal scales are not in an uninterrupted row, hence the inexact statement of their number. As with other fishes, the relative size of the eye decreases with the fish's increase in size. Thus the largest specimen has the eye 4 in head.

In habits this *Rivulus* does not seem to differ greatly from others that have been studied in aquaria. Excepting when food is in prospect it is very inactive, delighting in wriggling atop the masses of *Philotria canadensis*, with which the small aquarium is planted, so that its back is just at the surface. Here it will lie motionless for hours at a time, but when someone approaches the aquarium there is a quick scramble off the plants, and with quivering fins it awaits the chance to dart at anything moving near it. If one holds his finger a few inches above the surface, there is presently a splash, and one feels the sharp little teeth of the hungry fish close on the end. The aim seems always unerring. It takes small worms, tiny scraps of meat, and dried-insect fish-food. When frightened the colours fade, the chocolate turning to light chestnut-brown and the blue-green to pale greenish. The spawning is doubtless similar to the other *Rivuli*, the male crowding the female up against masses of plants, and single eggs being left adhering here and there. The fish seems admirably adapted to aquarium life, and if more are imported and propagated it may become commercially valuable, as has *Rivulus urophthalmus*. It is undoubtedly an efficient mosquito destroyer in its native haunts.

The type and a male paratype have been sent to the British Museum (Natural History).

* Regan, Ann. & Mag. Nat. Hist. (8) x. p. 496 (1912).

LXXVII.—On a new *Doratopsis*-stage of *Cheiroteuthis* from S.E. Africa. By G. C. ROBSON, M.A.

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DURING the marine biological survey of South African waters made in 1921 by Dr. J. D. Gilchrist a small Decapod Cephalopod was obtained in plankton tow-netted in $29^{\circ} 55' \text{ S.}$, $31^{\circ} 22' \text{ E.}$ (off Durban), at a depth of 100 fathoms. It was recently sent by Dr. Gilchrist to the British Museum (Natural History), and, upon examination, proves to be an interesting immature form of *Cheiroteuthis*. It seems to be clearly referable to the *Doratopsis*-stage, as recognized by Pfeffer (1912, pp. 553-4), but to be quite distinct from the known forms. It should be pointed out that, according to Pfeffer's view (*l. c.* pp. 550-53), we are not in a position to associate the larval stages known to be referable to *Cheiroteuthis* with the various adult specific forms. The present specimen may be possibly referable to one of the known species; though from a consideration of the details given below this will be seen to be very unlikely. A single specimen only was obtained—a fact which precludes any complete account of the structure and affinity of this form.

The significance of this curious metamorphic stage, which is found from near the surface down to 2500 metres, seems to be unknown. When found complete, the slender body with the long "neck," the minute arms and gigantic tentacles, the large fins, and elongate needle-like gladius give it an appearance which defies the most ingenious adaptational speculation, and inclines one to a belief in some sort of evolutionary "momentum."

This form is designated by a letter rather than by a specific name, in accordance with the view already expressed (Robson, 1924) that imperfectly represented forms of doubtful systematic position (amongst which we may certainly include larval forms) should not be given specific status.

Cheiroteuthis (*Doratopsis*-stage) A. (Fig. 1.)*Dimensions*.—

	mm.	
Length of mantle	5	
Width " "	2	
Length of fins	2.4	
Width " "	3.8	
Length of "neck"	4.8	
" " tentacles	5.8	
" " 1st arms	.86	} approximately.
" " 2nd "	.56	
" " 3rd "	.16	
" " 4th "	.8	

The general form is that of the stage known as *D. sagitta*, though the "neck" is more elongated. The mantle is rather wide, the breadth being about two-fifths of the length.

Fig. 1.

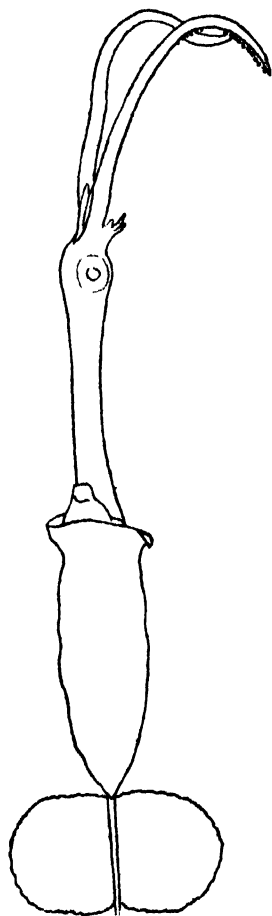


Fig. 2.

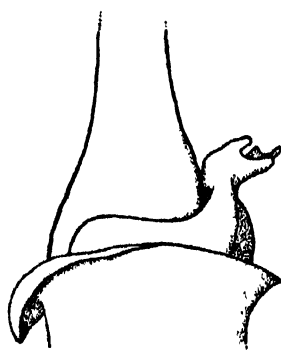


Fig. 1.—*Cheiroteuthis* (*Doratopsis*-stage) sp. A. $\times 7.7$.

Fig. 2.—*Cheiroteuthis* (*Doratopsis*-stage) A. Lateral view of funnel, $\times 17$.

The anterior edges are markedly flanged, and there is evidence of lateral compression. The gladius is broken and the remaining stump barely exceeds the fins in length.

The fins are large and wider than long. They resemble those of *D. sagitta* in general shape, but in none of the forms hitherto described is the width so marked. The "neck" (*Neck*) is very long, being almost the same length as the mantle. The nearest approach to this is seen in *D. vermicularis*, in which the distance from the eyes to the mantle-edge is .7 of the mantle-length in the smallest specimen figured by Pfeffer, while in the present case it is practically 1:1. The only form which rivals it in this respect is *Planctoteuthis planctonica* (Pfeffer, l. c. pl. xlv. figs. 6, 7). The "neck" is markedly slender, and therefore unlike the other forms, but it is just possible that this is due to a slight twisting caused by the fixation. The eyes are circular and devoid of any ventral lobe. The arms have the formula 4.2.1.3. All the pairs are minute and very immature. The disparity in size between them and the tentacles is rather remarkable, as in a small form of *D. sagitta* figured by Chun (pl. xlv. fig. 3), which is somewhat larger than the present specimen, the tentacles are only a little more than twice as long as the fourth arms. The first and second arms bear two to four large suckers each; the third are mere stumps, while the fourth have rather more numerous and smaller suckers which are biserial and alternating.

The tentacles are somewhat longer than the mantle. They are circular in section and diminish very gradually in size towards the extremity. The club is covered with suckers which are divided into the two groups characteristic of the *Doratopsis*-stage, viz., a proximal series of small suckers and a distal group of large ones. The suckers of each group have long stalks. Those of the distal group have the outer rim of the adherent surface furnished with numerous fine teeth, while the inner rim is usually smooth. Occasionally one finds suckers in which the inner rim is finely toothed and the outer furnished with a palisade of oblong plates.

The funnel presents a notable feature which is absent in the allied forms. The aperture is directed ventrally and is provided with two widely separated lips, of which the lower is much longer than the upper and is divided into three lobes (fig. 2). The articulatory cartilages are not unlike those of *D. sagitta*, but are not so finely drawn out anteriorly. The funnel-organ is strangely unlike that of *D. vermicularis* (Jatta, 1896, p. 22, text-fig. 45). The main plate, instead of being roughly V-shaped, is rather diamond-shaped, the long axis being disposed transversely.

This form differs from the various juvenile stages of *Cheiroteuthis* to which specific names have been given in

(1) the greater length of the "neck" as measured from the eye to the edge of the mantle*; (2) in the shorter distance from the eyes to the base of the arms; (3) in the small size of the fourth arms having regard to (i.) the size of the animal and (ii.) the size of the tentacle; (4) in the character of the funnel-aperture and funnel-organ; and (5) the slenderness of the "neck" (unless this is shown to be accidentally modified).

From the Indo-Atlantic *D. sagitta*, which is its nearest ally, it is distinguished by the majority of the above features, but it exhibits some affinity in (1) the shape of the fins, (2) the general shape of the mantle (*cf.* Chun, *l. c.* pl. xlv. fig. 3).

WORKS CITED.

- CHUN, C. 1910. *Wiss. Ergeb. Deutsche Tiefsee Exped.* xviii. 1.
 JATTA, G. 1896. *Fauna und Flora des Golfes von Neapel*, xxiii., Cefalopodi.
 PFLEGER, G. 1912. *Die Cephalopoden der Plankton Expedition.*
 ROBSON, G. C. 1924. *Reports, Fisheries and Marine Biol. Survey, Union of S. Africa.* (In press.)

LXXVIII.—*Descriptions and Records of Bees.*—C. By T. D. A. COCKERELL, University of Colorado.

Colletes kudiensis, sp. n.

♂.—Length about 8 mm., wing 6.5.

Black, including legs, antennæ, and tegulæ; hair of head and thorax above rather long, erect, bright but rather pale ferruginous; hair of face, cheeks, pleura, and metathorax long and white; malar space about as long as broad; third antennal joint shorter than fourth; mesothorax and scutellum shining and well punctured; basal channel of metathorax narrow, divided into shining spaces by cross-ridges; sides of posterior truncation rugose. Wings hyaline, very faintly dusky, stigma dull red, nervures piceous; second cubital cell very broad, receiving first recurrent nervure a little beyond middle; spurs pale; abdomen shining, distinctly but delicately and not densely punctured; hair-bands very thin and inconspicuous; sixth ventral segment with a slight keel, and a longitudinal depression on each

* This character is not affected by age (reckoned by size), as in the specimens of varying size given by Pfeiffer (*l. c.* pl. xlv.) the length from the eyes to the mantle-edge remains fairly constant.

side of it. Seventh ventral plate of the type of *C. montanus*, Morawitz, in all respects, except that the elongated lobes are practically parallel-sided, with the ends not appreciably broadened. At the inner side of the bristly area on each lobe, below the middle, is a series of ten to twelve modified bristles, directed obliquely caudo-mesad. There are pointed lateral projections near the base of the lobes as in *C. montanus*.

Kudia River, Siberia, July, 1 ♂ (*Cockerell*).

Very close to *C. montanus*, which was described from Turkestan, but has since been found in the European Alps and in Scotland. In Morice's table this runs to *C. montanus*, except that the hair on clypeus is so dense that the sculpture cannot be seen. In Friese's table of *Colletes* of Central Europe it cannot go to *montanus*, because the male of that species has the hair of thorax above and below uniformly yellowish. It would go better to *C. impunctatus* in Friese's table, but that species has an entirely different seventh ventral plate. *C. mongolicus*, Pérez, is rather similar on external characters, but here again the seventh ventral is quite different.

Colletes ventraliformis, sp. n.

♂.—Length about 9 mm., anterior wing 6.5.

Rather long and slender, black, including legs, antennæ, and tegulæ, but the bidentate mandibles reddened apically; hair of occiput pale reddish, of thorax above grey, of face long and creamy-white, of cheeks, pleura, and metathorax white, not strongly contrasting with dorsum; malar space conspicuously broader than long, but not twice as broad; fourth antennal joint considerably longer than third; mesothorax and scutellum highly polished, with rather weak, scattered punctures; channel at base of metathorax very narrow, with the usual cross-ridges; lateral faces of metathoracic truncation shining, and with transverse plicæ. Wings faintly dusky, stigma dusky reddish, nervures dark; second cubital broad, receiving recurrent nervure at or a little before middle. Hind spurs and claws red; abdomen shining but distinctly punctured; margins of first five segments with pure white hair-bands, failing in middle of first; venter with somewhat curved white hair-bands; second ventral segment with distinct lateral elevations, but third and fourth without. The abdominal bands are liable to be denuded.

Genitalia and seventh ventral plate practically as in

C. ventralis, Pérez, except that the hair on the ends of the claspers is not so long.

Okeanskaja, Siberia, Aug. 5, 2 ♂ (*Cockerell*).

C. ventralis was described from the desert region of Mongolia, whereas the present species is from the moist coast region. Yet they are very closely related, and evidently derived from a common stock. *C. ventralis* is a little smaller, border of fifth abdominal segment with blackish hairs, malar space twice as broad as long, and elevations on ventral abdominal segments 2 to 5. On the thin border of the sagittæ of *C. ventraliformis* is a series of widely spaced erect hairs.

Melitta latronis, sp. n.

♂.—Length about 11 mm., anterior wing 8.2.

Black, including antennæ and mandibles; small joints of tarsi rufescent; occiput and dorsum of thorax with long, very pale fulvous-tinted hair; face, cheeks, pleura, and sides of metathorax with white hair; vertex with sparse black hair; flagellum stout, simple (cylindrical), obliquely truncate at end; vertex rugose; a shining smooth space laterad of each lateral ocellus; mesothorax and scutellum rugosopunctate, but glistening; area of metathorax finely granular; tegulæ dark brown with paler margins. Wings strongly dusky, stigma dull rufous, nervures dark fuscous; second cubital cell receiving first recurrent nervure in middle. Inner side of tarsi with bright ferruginous hair; spurs nearly white, tinged with reddish; abdomen shining, finely punctured, second segment depressed about a third of the exposed portion; apical part of first segment with long white hair; segments 2 to 4 with narrow apical bands of pure white hair; segments 2 and 3 with thin dorsal white hair, only conspicuous in lateral view, 4 to 6 with black hair, but venter with much white hair, showing at sides of apical part of abdomen viewed from above; apical plate red, very broadly rounded, with an elevated broad blackish margin; end of claspers very broadly rounded, broader than the very thick stem.

Kongaus, Siberia, August, 1 ♂ (*Cockerell*).

The name refers to the head of the band of Chinese bandits we met in the forest at Kongaus, who was good enough to permit us to continue our work unmolested. Radoszkowski described no less than four species of *Melitta* from females collected at Vladivostok. Of these, only

M. media could possibly belong to our species, and, so far as I can judge from the description of the female only, it is probably distinct. Among the described males our insect seems nearest to *M. wankowiczi* (Rad.), but that is considerably larger.

M. amurensis (Rad.) is from Vladivostok, not the Amur, as Dalla Torre has it. The custom of calling species from near Vladivostok "amurensis" (see, for instance, *Trachys amurensis*, Obenberger, 1922) is apt to be misleading, though it has some justification as referring to the Amur Gulf. *M. thoracica* (Rad.), also from Vladivostok, is 89 years later than *M. thoracica*, Kirby; but the latter was based on *Apis thoracica*, Fabricius, and is an *Andrena*.

Alcidamea parvula (Dufour & Perris).

The genus *Alcidamea* of Cresson has been supposed peculiar to North America, but *Osmia parvula* of Europe evidently belongs there. This species extends right across the Palearctic region, or at least reappears in the far eastern part, for my wife and I collected 2 ♀ and 7 ♂ on the Kudia River, coast of Siberia, last July. Miss Sandhouse has mounted the genitalia of a Kudia River *A. parvula*. The structure is in general similar to that of American *Alcidamea*, but the stipites are claviform and curved inward apically, and the broadened portion is thinly beset with rather long hairs, except at end, where it is nude. In American *Alcidamea* the stipites are more strap-shaped, not claviform apically. In *Ashmeadiella* they are abruptly bent, the apical part having the outline of a duck's head.

One of the Kudia River females (typical *parvula*) has black hind spurs and long second cubital cell; the other has hind spurs red, black at end, and second cubital shorter. The males also vary in the length of the second cubital. Possibly there are two species involved, but at present I cannot separate them in any satisfactory manner.

Xylocopa circumvolans, Smith.

On the top of the hill above the temple at Tsuruga, Japan, last June, I found the males of this species flying round and round in circles, presumably searching for the females. Smith does not mention this habit, but the name he gave suggests that he was aware of it.

Osmia (Acanthosmia) macrodonta, sp. n.

♂.—Length 8·5 or 9 mm., anterior wing 6·5.

Black, slender, head and thorax with long white pubescence, very faintly tinged with yellowish dorsally, pure white on sides of face, cheeks, and under side of thorax; mandibles black; clypeus entirely dull and very densely and minutely punctured, the lower margin slightly concave; scape robust, punctured; flagellum slender, reddened beneath toward end; last joint rounded and compressed; cheeks broad and flattened; mesothorax very densely punctured, dull, slightly shining on disc posteriorly; scutellum and hind border of mesothorax densely covered with very long hair; tegulæ piceous in front, rufous posteriorly. Wings strongly suffused with reddish brown, stigma and nervures piceous; basal nervure meeting nervulus; second cubital cell receiving first recurrent nervure near base. Legs slender, spurs pale rufous, small joints of tarsi rufous, hair on inner side of hind tarsi very pale yellowish; hind tibiæ robust, more than twice as broad at end as their basitarsi. Abdomen rugose, but shining; sides of segments with white apical hair-bands, not very conspicuous; second ventral with a very large thick and obtuse median tubercle; sixth segment with short lateral spines; apex broad and obtusely angulate; third and fourth ventrals with low obtuse transverse ridges.

Kudia River, Siberia, July (*W. P. Cockerell*).

This and the next fall in Friese's key near *O. tuberculata*, Nyl., but are quite distinct. The following key separates them from a series of related males:—

- | | |
|---|--------------------------------|
| Tubercle of second ventral segment deeply sulcate above, and directed caudad. (<i>Jena Thür, at Viola; Friese.</i>) | <i>rufohirta</i> , Latr. |
| Tubercle of second ventral not directed caudad. | 1. |
| 1. Tubercle low, obtuse, transverse, not very conspicuous in lateral view | <i>leucomelana</i> (Kirby). |
| Tubercle elevated, very conspicuous (conical or pointed) in lateral view | 2. |
| 2. Larger species, with bright fox-red hair on thorax above. (<i>Switzerland; Morice.</i>) | <i>tuberculata</i> , Nylander. |
| Smaller species, with white or very faintly yellowish hair on thorax above | 3. |
| 3. Tegulæ with anterior half piceous or black; mesothorax dull | <i>macrodonta</i> , sp. n. |
| Tegulæ entirely pale testaceous; mesothorax shining | 4. |
| 4. Abdomen ending in an acute point. (<i>Biskra; Morice.</i>) | <i>freygessneri</i> , Friese. |
| End of abdomen broad and rounded | <i>amaguensis</i> , sp. n. |

Osmia (Acanthosmia) amaguensis, sp. n.

♂.—Length about 8 mm.

Black, similar to *O. macrodonta*, but easily distinguished by the following characters: smaller; middle of mesothorax polished, with the punctures well separated; tegulae pale testaceous; hair of thorax above entirely white; wings clearer, not suffused with red along the veins, stigma clear red; basal nervure falling short of nervulus; second cubital cell shorter, receiving first recurrent at a distance from base fully equal to half intercubitus, and the second recurrent a like distance from apex; hind tarsi entirely obscure reddish. Abdomen more robust, hind margins of segments brownish, the very thin hair-bands extending right across; lateral spines of sixth segment larger; seventh very broadly rounded, not pointed, excavated above; tubercle on second segment high but transverse, rather sharp-edged; claspers exceedingly broad and stout, curved inward at apex.

Kudia River, Amagu, Siberia, July (*Cockerell*).

Bombus diversus, Smith.

Common at Tsuruga, Japan, in June (*Cockerell*).

It is especially fond of the flowers of the fragrant *Hovenia dulcis*, Thunberg (det. Rehder).

Bombus sapporoensis, Cockerell.

Tsuruga, Japan, June (*Cockerell*), where it has a most remarkable "mimic" in a Syrphid fly, a species of *Mallota*. The colours (black and yellow, with end of abdomen ferruginous) and banding are precisely the same, though there is no reason to believe that the fly is biologically associated with the *Bombus*.

Megachile tsurugensis, sp. n.

♀.—Length about 12 mm.

Robust, black, with very broad abdomen; hair of head and thorax mainly white, faintly tinged with yellow on face, tubercles, borders of thorax above, and metathorax, but black on vertex and discs of mesothorax and scutellum; under side of mandibles with red hairs; first two abdominal segments with white hair, the others with short black hair, but segments 1 to 4 with narrow white hair-bands, interrupted or evanescent in middle; ventral scopa white with a slight creamy tint, black on last two segments; hair on

inner side of middle tarsi bright orange, of hind tarsi deep ferruginous; mandibles black, quadridentate; antennæ black; clypeus convex, with a subapical depression or pit, glistening, but closely punctured; mesothorax and scutellum dullish, densely rugoso-punctate; tegulæ black, with outer margin pallid. Wings dusky, nervures black. Abdomen closely punctured, but glistening; hind basitarsi longer than the small joints together, parallel-sided; spurs light red.

Tsuruga, Japan, June, 2 ♀ (*Cockerell*).

In Friese's arrangement this is a *Paramegachile*, going in the key to *M. picicornis*, Mor., but differing by the colour of the antennæ. It thus falls in the Japanese fauna next to *M. harimensis*, Ckll., from which it is easily known by the lower edge of clypeus not subemarginate, the absence of fulvous hair on thorax above, and the bright red hair on inner side of hind tarsi.

Megachile analis chionura, subsp. n.

♀.—Length about 13 mm., anterior wing 8.5.

Black, robust, hair of head white, very faintly yellowish on face and upper part of thorax, but intense black on vertex and mesothorax except anteriorly and laterally; mandibles black, shining, broad and quadridentate; clypeus densely punctured, with a smooth median line, lower margin crenulate or finely tuberculate; antennæ entirely black; mesothorax dull at sides, but disc flattened, polished, with well-separated punctures; scutellum elevated and mammiform in middle; tegulæ black. Wings strongly brownish; basal nervure falling short of nervulus; second cubital cell rather high, receiving first recurrent nervure twice as far from base as second from apex; small joints of middle tarsi broad and ciliated; hind basitarsi much broadened, with bright red hair on inner side. Abdomen shining, with long greyish-white hair on first three segments; segments 3 to 5 with white hair-bands, that on fifth best developed, 4 and 5 with black hair on disc; sixth segment densely covered with appressed white hair; ventral scopa pale red, white at base, black on last two segments.

Kudia River, Siberia, July (*W. P. Cockerell*).

Certainly very near to *M. analis*, Nyl., and best regarded as a subspecies, but distinguished by the light hair being paler, and the scopa with the last two segments black. It resembles the variety *albida*, Friese (Turkestan and Sweden),

by the abdominal segments 3 to 5 being pale-banded, but differs from that by the black hair of the mesonotum. Another related species is *M. mongolica*, Morawitz, from Ta-wan, but this has a more normal scutellum and the ventral scopa entirely red. I have already recorded *M. analis* male from the Kudia River. It should no doubt be associated with the *chionura* female.

Megachile sichotana, sp. n.

♂.—Length 8-10.5 mm.

Vertex with black hair, but that of thorax above all pale fulvous; tegulæ red, dark basally; anterior coxæ hairy, without spines; anterior tarsi simple; keel of sixth abdominal segment nearly entire, with a shallow median depression, or more distinctly notched; a small obtuse tooth at each side of seventh segment. This is in all respects so like *M. melanopyga*, Costa, that at first it appears identical, but it is certainly distinct. In *M. melanopyga* the fourth ventral segment has a broad pallid apical area, and the black margin below it is strongly concave; in *M. sichotana* the black margin is thick, straight, fringed posteriorly with white hair, and there is no pallid marginal area.

♀.—Resembles *M. ferritincta*, but smaller and less robust, with pale hair on head and thorax, the light hair above white, not fulvous; vertex behind ocelli more shining and shorter; tegulæ rufous; sixth dorsal segment of abdomen straight in lateral profile.

Okeanskaja, Siberia, 1 ♂, 1 ♀, August (Cockerell); Kudia River, 4 ♂ (Cockerell).

The type is the male from Okeanskaja. The female may not belong here, as it is not like *M. melanopyga*, and is very similar in most respects to *M. ferritincta*. Yet its general aspect is so like that of the males as to suggest identity. The name of the species is derived from the Sichota-Alin Range, near the base of which the insect is found.

Megachile hasticornis, sp. n.

♂.—Length 11 to 14 mm.

Black, mainly long white hair, pale brown on vertex, fulvous-tinted on mesothorax and scutellum; abdomen shining black, without hair-bands; mandibles black, with more or less of a red spot on base of apical tooth; antennæ

entirely black, last joint of flagellum broad and flat, like a spear-head, but blunt; cheeks with a dense patch of white hair below; mesothorax dullish, but punctures on disc well separated; tegulæ black, with red margin. Wings brownish; basal nervure meeting nervulus, the latter oblique; anterior coxæ spined; their femora red above and below, but black on outer side, and with a broad black band on inner side above; a fringe of long white hair on anterior coxæ, trochanters, and basal two-thirds of femora, but near base of femur there are long black hairs behind the white; anterior tibiæ pale at apex and on inner face, the latter with light red hair, and the apex beneath with long creamy-white hair; anterior tarsi cream-colour, the first three joints greatly broadened, with a pale fringe, which is red on inner side; second joint with a black spot within; first abdominal segment with long thin white hair, second to fifth with long black hair, white at sides of second and third anteriorly; keel of sixth segment bilobed by a more or less semicircular emargination; seventh segment tridentate.

Kudia River, Siberia, July, 2 ♂ (*W. P. Cockerell*).

Very close to *M. circumcincta* (Kirby), with the same kind of anterior legs, but the black hair begins on second abdominal segment, and the emargination of the keel of sixth segment is much larger. The general aspect of the insect is much darker, without the conspicuous fulvous hair on thorax. The process beneath the mandibles is very large. The third antennal joint is about three-quarters length of fourth, and the fourth equal to fifth. In some respects there is closer resemblance to *M. nigriventris*, Schenck, and possibly *M. hasticornis* should be considered a subspecies of that, recognisable by the black hair on second abdominal segment. This is suggested by the proportions of the antennal joints and the broad anterior tarsi.

Megachile melanopyga amaguella, subsp. n.

♂.—Length 9 to 11 mm.

Like the European *M. melanopyga*, Costa, but with more abundant black hair on head and thorax above; abdomen shining, second segment with much black hair, hair-bands pure white: median lobe of seventh segment distinctly angular.

Kudia River, Siberia, July, 6 ♂ (*T. D. A. and W. P. Cockerell*).

We did not get any female of the *M. melanopyga* type.

Megachile lignisecula, sp. n.

♂.—Length 11 mm.

Similar to *M. ligniseca* (Kirby), of Europe, but smaller, seventh abdominal segment rounded in middle, not bidentate; second recurrent nervure joining second cubital cell almost at end; dorsum of thorax with hair pale fulvous, without black (but vertex with black hair); hair-bands on abdominal segments 3 to 5 pure white. The hair of the face is light fulvous, brighter than that on thorax above. Abdomen strongly shining; transverse keel of sixth segment deeply bilobed; mandibles, antennæ, and tarsi black; sixth dorsal segment very thinly beset with long erect white hairs.

Kudia River, Siberia, 1 ♂, July (*Cockerell*).

Very near to *M. ligniseca*, but apparently a distinct species.

Megachile ferritincta, sp. n.

♂ (type).—Length 11.5 mm.

With broad parallel-sided abdomen; black, including mandibles, antennæ, tegulæ, and legs; hair of face dense and creamy-white, of vertex long, abundant, and rusty-black, of cheeks white, of occiput pale fulvous; mandibles quadridentate, the two middle teeth sharp; thorax above with red hair, but a broad band of rusty-black across posterior part of mesothorax and scutellum; pleura with white hair; mesothorax with extremely dense fine punctures, slightly shining on disc. Wings dusky, stigma rufous, nervures black; basal nervure falling short of nervulus; first recurrent joining second cubital cell a distance from base about equal to half intercubitus; spurs and hair on inner side of tarsi red; anterior tarsi slightly reddish, with a fringe of white hair behind; anterior femora with a smooth red area on inner face toward apex; under side of these femora and their trochanters with abundant very long pure white hair; anterior coxæ with moderately long black spines; hind tibiæ very robust, curved. Abdomen with abundant fulvous hair on first three segments, but third

with a transverse band of black; fourth and fifth segments with long black hair (a little fulvous at base of fourth), and white fringes; apex with long pale hair; keel of sixth segment short, with irregular margin, and a deep but small emargination; seventh segment with three sharp teeth.

♀.—Length about 12 mm.

Similar to the male in appearance; mandibles quadridentate; clypeus convex, polished, rather closely punctured, with a deep subapical pit; lower margin thickened and slightly concave in middle; disc of mesothorax with black hair, not forming a transverse band, and hair of scutellum all red; hair of cheeks and pleura suffused with red; tegulæ with pallid outer margin; hind basitarsi not greatly broadened. Abdomen with fulvous hair on first two segments, 3 to 5 with distinct narrow pale (reddish-white) bands, and black hair on disc; sixth segment gently concave in lateral profile, black, and quite nude; ventral scopa white, stained with reddish at sides, black on last two segments.

Kudia River, Siberia, July, 1 ♂, 2 ♀ (W. P. and T. D. A. Cockerell).

Allied to the Japanese *M. harimensis*, Ckll., but distinguished by the dark tegulæ and other characters. In Friese's tables the male runs near *M. buyssoni*, or perhaps *M. genalis*, but is quite distinct from these. The female runs near to *M. picicornis*.

Megachile polita, sp. n.

♀.—Length about 12 mm.

Robust, black, including the quadridentate mandibles, antennæ, tegulæ, and legs; hair of head and thorax long and mostly dull white, but black on vertex and discs of mesothorax and scutellum; clypeus highly polished (dull at sides above), depressed in apical middle, punctures on disc irregular and sparse, lower margin very briefly bidentate, and with a little median raised line; supraclypeal area with its lower margin in middle (and contiguous area on clypeus) highly polished and impunctate; disc of mesothorax shining, with well-separated punctures; scutellum dull, slightly shining in middle. Wings strongly dusky, nervures black; basal nervure meeting nervulus; second cubital cell receiving first recurrent nervure a considerable distance from base, but second almost at apex. Legs with white hair, bright ferruginous on inner side of tarsi; hind basitarsi long and nearly parallel-sided; spurs red. Abdomen

shining, with narrow weak white hair-bands on hind margins of segments 3 to 5, failing in middle on 3; sixth segment without evident hair, slightly concave in lateral profile; ventral scopa yellowish white, black on last two segments.

Kudia River, Siberia, July, 1 ♀ (*Cockerell*).

Very like *M. tsurugensis* from Japan, but easily separated by the shining mesothorax. In Friese's tables it falls next to *M. picicornis*, differing at once by the entirely black antennæ and sixth abdominal segment not hairy.

The following key separates the *Megachile* of the 1923 expedition:—

- | | | |
|--|-----|--|
| Males | 1. | |
| Females | 9. | |
| 1. Anterior tarsi modified | 2. | |
| Anterior tarsi simple | 5. | |
| 2. Last antennal joint slender and simple;
anterior tarsi light, but not much modified | | <i>analis</i> , Nyl. |
| Last antennal joint broadened and flattened | 3. | |
| 3. Anterior femora mainly red, with a sharp
keel on outer side apically | 4. | |
| Anterior femora mainly dark, and without
such a keel | | <i>hasticornis</i> , Ckll. |
| 4. Hind spurs dark; anterior femora without
a distinct black apical area on outer face
of keel | | [Ckll.
<i>willughbiella prorecta</i> , |
| Hind spurs red; anterior femora with a
distinct black apical area on outer face
of keel | | [Ckll.
<i>willughbiella kudiensis</i> , |
| 5. Dorsum of thorax with pale, usually fulvous
hair, not mixed with black or fuscous;
anterior coxæ without spines | 6. | |
| Dorsum of thorax with conspicuous dark
hair | 7. | |
| 6. Abdomen highly polished; keel of sixth
segment deeply emarginate; a con-
spicuous spine or tooth at each side of
sixth segment | | <i>lignisecula</i> , Ckll. |
| Abdomen rougher; keel of sixth segment
subentire or moderately emarginate | | <i>sichotana</i> , Ckll. |
| 7. First three abdominal segments with abun-
dant fulvous hair; keel of sixth segment
with a small but deep emargination | | <i>ferritincta</i> , Ckll. |
| First three abdominal segments without
fulvous hair | 8. | |
| 8. Keel of sixth segment with a pair of
rounded lobes | | <i>ligniseca</i> , Kirby. |
| Keel of sixth segment entire or slightly
emarginate | | [Ckll.
<i>melanopyga amaguella</i> , |
| 9. Ventral scopa mainly red | 10. | |
| Ventral scopa mainly white or creamy | 11. | |

- | | |
|--|--|
| 10. Ventral scopa bright red, black on last two segments; clypeus densely punctured .. | [Ckll. <i>willughhiella kudensis</i> , |
| Ventral scopa fulvous, black on last two segments; clypeus not densely punctured; last dorsal without appressed white hair | <i>ligniseca</i> , Kirby. |
| 11. Last dorsal segment of abdomen densely covered with appressed white hair; hair on third segment long | <i>analis chionura</i> , Ckll. |
| Last dorsal without appressed white hair .. | 12. |
| 12. Hair of scutellum entirely fulvous or pale. | 13. |
| Disc of scutellum with black hair | 14. |
| 13. Hair of thorax above fulvous | <i>ferritineta</i> , Ckll. |
| Hair of thorax pale, not fulvous | <i>sichotana</i> , Ckll. |
| 14. Middle of mesothorax shining | <i>polita</i> , Ckll. |
| Middle of mesothorax dull (Japan) | <i>tsurugensis</i> , Ckll. |

It will be observed that there is a tendency for European types to be represented in the Maritime Province of Siberia by more than one segregate. This may be due, at least in part, to a return immigration from Sachalin or Japan, meeting the modified types of the mainland and co-existing with them. This sort of thing is less likely to happen in Europe, because of the recent glaciation of the British Islands, and also on account of their late separation from the continent.

I cannot close the hundredth paper of this series without an expression of appreciation for the extraordinarily efficient co-operation of the publishers and printers. Not only have the papers appeared regularly and promptly, even in the midst of war, but in spite of the impossibility of submitting proofs there have been almost no misprints. I can only hope that posterity will find these papers sufficiently valuable to justify all the skill and care bestowed upon them by the publishing house.

LXXIX.—*New Anthribidæ allied to Choragus.*

By Dr. K. JORDAN.

IN *Choragus* and the allied genera the eyes are so placed as to be nearer together on the vertex than at the scrobes of the antennæ, the frons being narrower anteriorly than posteriorly. The species described in this paper belong to that section of the group in which the elytra are

strongly punctate-striate and the head and pronotum densely punctate-reticulate. So far as is known, these small insects live in dry wood like the British *Choragus sheppardi*.

Dysnos, Pasc. (1859).

It is advisable to restrict this genus to those species in which the ultimate segment of the antenna is produced into a long apical process.

Genotype: *D. auricomus*, Pasc. (1859).

1. *Dysnos auricomus*, Pasc. (1859).

♂ ♀. Elongatus, cylindricus, nigro-brunneus, antennis pedibusque subruflis, litoris griseis ornatus; pronoto latitudine paululo brevior, angulo carinæ obtuso; prosterno longo confertissimo ruguloso-punctato.

Long. (cap. excl.*) 3·2-3·6 mm.

Hab. Philippines: Leite (*J. Whitehead*); Aru (*Wallace*).

Anteriorly on pronotum an oblong of four lines, from this oblong to scutellum a straight median line, an elongate spot halfway between median line and lateral carina, and farther forward several spots connected with one another, all grey. On elytra the grey pubescence especially distinct in the stripes of punctures (the hairs directed from right and left across the punctures), in an oblique view spots appear in some interspaces, particularly before, in and behind middle.

Segments 9 to 11 of antenna together a little longer than 3 to 8. Frons posteriorly less than half as wide as the interspace between the antennæ. Prothorax widest in middle, nearly as long as broad, very densely, but rather minutely, rugulate-reticulate, almost evenly convex, slightly depressed posteriorly; carina antebasal, angle obtuse, lateral carina extending to middle, carinula oblique, angle of prothorax acute in dorsal aspect, but not long.

Elytra cylindrical, half as long again as pronotum, sub-basal callosities vestigial, stripes deep. Pygidium broader than long, rounded, with sharply marked basal median groove.

Prosternum densely, but rather minutely, punctate-

* As length we give the distance of the anterior margin of the pronotum from the apex of the pygidium in a straight line.

reticulate, long, strongly slanting in middle, without glossy impunctate space below carina; metasternum with dispersed large punctures; abdomen minutely rugulate-punctate, somewhat coriaceous, proximal segments with a basal row of larger punctures. Hind femur reaching to apex of abdomen; third tarsal segment rather broad.

2. *Dynos notatus*, sp. n.

♂. Subcylindricus, niger, antennis pedibusque rufescentibus; elytris lineolis rufis griseo-tomentosis notatis; antennarum clava angustissima, longa, segmentis 3^a-8^a simul sumptis duplo longiore; prothorace brevi, angulo carinae subrecto apice rotundato; pygidio tuberculo dorsali instructo.

Long. 1.8 mm.

Hab. Philippines: Pt. Bango, Mindanao, 1 ♂, 2 ♀.

Eyes broad, less than half as far apart as the antennae. Segment 2 of antenna a little shorter than 1, but much thicker, club unusually long, very narrow, 9 and 10 asymmetrical. Pronotum three-fifths broader than long, apical margin rufous, pubescent grey, several ill-defined spots on disc and on sides and the pubescence along carina grey; dorsal carina slightly convex in middle and interrupted, lateral angle a little larger than 90°, with the tip rounded, lateral carina not reaching middle, carinula almost horizontal, basal angle of prothorax very little projecting downwards. Scutellum transverse.

Elytra strongly striated, more than twice as long as pronotum, bearing before, in and behind middle a variable number of rufous elongate spots which are covered with a grey pubescence, between them and the sides some more grey spots. Pygidium strongly rounded at apex, in ♂ with a distinct swelling in middle, in ♀ with a high subapical tubercle.

Prosternum densely punctate, a rather broad and well-defined postmedian stripe from coxa upwards impunctate, glossy, no glossy space below carina at hind angle. Metasternum and abdomen more finely and very densely punctate.

MELANOPSACUS, gen. nov.

Like *Dynos*, but the last segment of the antenna not prolonged, being elliptical or ovate. Basal angle of prothorax produced downward, appearing acute in dorsal aspect.

Genotype: *M. fortis*, sp. n.

3. *Melanopsacus fortis*, sp. n.

♂ ♀. Niger, cylindricus, pube cinereo-aurea variegatus, antennis pedibusque plus minus rufis; prothorace longitudine paulo latiore; scutello elevato, tuberculiformi, acuto; elytris pronoto fere duplo longioribus; pygidio tam longo quam lato, apice rotundato; prosterno densissimo foveatim punctato, area impunctata ad angulum posticum; abdomine minute punctato, punctis grossis dispersis notato.

Long. 3-4 mm.

Hab. Perak (*W. Doherty*), a small series.

Most easily recognized by the scutellum rising as a sharp tubercle above the level of the margin of the elytra.

The greyish-golden pubescence fairly conspicuous on the upperside, forming diffuse patches on the pronotum and lines in the stripes of the elytra, as well as a few short spots in the interstices.

Frons posteriorly one-third as wide as the interspace between the antennæ. Club of antenna very slender, 9 and 10 apically asymmetrical, their narrow apical processes about half as long as the segment is wide, 8 as long as 3. Rostrum and frons coarsely reticulate. Pronotum densely reticulate, the lines confluent as transverse ridges, sides slightly swollen in middle, greatest width at base, dorsal surface strongly convex; carina convex, antebasal in middle, subbasal laterally, angle very acute, extending on to basal projection of prothorax, which is strongly produced downward, lateral carina curved.

Elytra nearly half as long again as broad, subbasal callosities barely vestigial, stripes deep. Pygidium rugate-reticulate, strongly narrowing from lateral angles to apex, which is rounded off.

On prosternum an impunctate stripe from coxa upwards, punctures large, on anterior area denser than on posterior area, below carina an impunctate, vertically plicate, space. Punctures of metasternum much smaller, dispersed. Abdomen densely minutely punctate, with dispersed larger punctures, which are arranged in three or four transverse rows on segments 2 to 4; in ♂ 1 to 4 medianly flat, depressed, with sides of the depression slightly raised.

4. *Melanopsacus lapillus*, sp. n.

♂. Brevis, ovatus, fortiter convexus, rufo-brunneus, antennarum basi tarsisque pallidis; lobo basali prothoracis acutissimo longo; pygidio magno, semicirculari.

Long. 3-3.3 mm., lat. 1.8-2.2 mm.

Hab. Perak (*W. Doherty*), 2 ♂ ♂.

A short broad species, very strongly convex above and below; dorsal surface, in lateral aspect, almost evenly convex from mouth to anus, the highest point behind the base of the elytra; no humps except the humeral callosity.

Extreme apical margin of rostrum sunk below the somewhat convex surface of the rostrum; distance from antenna to apical margin shorter than from antenna to antenna. Eyes one-fourth nearer together than antennæ. Segment 2 of antenna shorter than 1, 8 shorter than 3, club narrow, about as long as 3 to 6 together, 9 and 10 asymmetrical at apex.

Pronotum evenly convex, widest posteriorly, one-third broader than long, basal angle a long process directed obliquely downward; dorsal and lateral carinæ continued to near apex of this process, their angle very acute, dorsal carina somewhat incurved in middle, being here a little nearer the basal margin than laterally. Scutellum transverse, bituberculate.

Elytra widest at base, slightly flattened around scutellum. Pygidium unusually large, semicircular, convex, with a narrow depression along raised apical margin, the basal transverse oblique carina somewhat incurved.

Underside densely and grossly punctate-reticulate, the punctures particularly large on prosternum, less dense and smaller on metasternum, at posterior angle of prosternum an impunctate space. Hind femur reaching a little beyond apex of abdomen.

5. *Melanopsacus calculus*, sp. n.

♀. Præcedenti similis, minus convexa, rostro brevior, grossissime rugato-reticulato, fronte inter oculos latiore, carina pronoti dorsali convexa ante scutellum antebasali.

Hab. N. Borneo: Mt. Marapok, 1 ♀.

Twice as long as broad. Eyes as widely apart as the scrobes of the antennæ. Pronotum somewhat flattened before the carina, which is farthest from basal margin in middle, not at sides. Scutellum transverse, slightly depressed in middle. Subbasal callosity of elytrum indicated, suture not depressed at base, basal margin of elytrum rather thick, slightly and evenly convex from scutellum to shoulder. Pygidium triangular, its apex rounded off and feebly upturned. Puncturation of abdomen very dense, but less coarse than in the previous form.

6. *Melanopsacus nox*, sp. n.

♀. Statura præcedentium, angulo carinæ subrecto haud angulum prothoracis versus producto.

Long. 2·8 mm.

Hab. Perak (*W. Doherty*), 1 ♀.

Ovate, black. Antenna rufescent, segment 1 and 2 paler, 2 much shorter than 1, 3 a little shorter than 5, 8 about as long as 5, 9 to 11 slightly decreasing in length, 9 and 10 elongate-triangular, symmetrical, 11 elliptical, its apex pointed, 9 longer than 7 and 8 together. Frons one-third narrower than interspace between antennæ.

Pronotum more than half as broad again as long, almost gradually narrowed from base to apex, the sides very little rounded in middle, basal lateral lobe of prothorax shorter than in the two preceding species, the angle of the carina smaller than 90°, but not continued downwards on to the lobe, dorsal carina slightly concave in middle. Scutellum triangular, very little broader than long.

Basal margin of elytra subtuberculiform at each side of scutellum; subbasal callosities fairly distinct, the base slightly depressed twice in front of them between scutellum and shoulder.

Prosternum densely punctate; below carina an impunctate, vertically plicate space. Abdomen densely punctate, somewhat coriaceous, segments 1 to 3 with transverse rows (about three) of large punctures, on 2 and 3 a lateral area coriaceous and almost impunctate.

7. *Melanopsacus atratus*, sp. n.

♂ ♀. *Atratus*, elongatus, cylindricus; fronte capitis angusta; angulo prothoracis carinæ recto; subtus densissime punctatus, prosterno sine area basali impunctata.

Long. 2·8–3·2 mm.

Hab. Sarawak: Matang Road, ix. 1910, a series from the Sarawak Museum; also from Sumatra.

Antenna and legs rufescent; segment 2 of antenna much shorter than 1, club narrow, 9 and 10 triangular, not quite symmetrical, a little over twice as long as broad (the apical projection not included in the length).

Rostrum measured from base of antenna a little longer than the distance of the antennæ from each other. Frons posteriorly in ♀ half, in ♂ less than half, as wide as the interspace between the antennæ.

Pronotum one-fifth shorter than broad, dorsal carina antebasal throughout, very feebly incurved in middle, lateral angle 90° , the extreme tip being rounded off, connected with basal angle of prothorax by a strong oblique carinula, which forms with the dorsal and lateral carinae obtuse angles of equal size, lateral carina extending to middle, slightly curved. Scutellum triangular, broader than long, grey.

Elytra half as long again as broad, two-thirds longer than pronotum, regularly cylindrical, subbasal callosities vestigial. Pygidium as broad as long, rounded-triangular from lateral angles.

Underside very densely punctate, the punctures in posterior area of prosternum very large and close together, no impunctate glossy space below carinae. In front of fore coxae a small median tubercle. Third segment of tarsi rather broad.

8. *Melanopsacus anthracinus*, sp. n.

♂. Cylindricus, ater; fronte angusta; carina laterali prothoracis brevi, angulo carinae recto; prosterno densissime punctato, area basali laterali impunctata.

Long. 2.3 mm.

Hab. Sikkim: Gopaldhara (*H. Stevens*), 1 ♂.

Twice as long as broad, black, antenna and legs very slightly rufescent. Frons half as wide as rostrum between antennae. Distance from antenna to antenna shorter than from antenna to apical margin of rostrum. Segment 2 of antenna much shorter than 1, club symmetrical, its three segments about equal in length, each not quite twice as long as broad, 9 and 10 triangular, with the apex truncate (excepting apical projection).

Prothorax nearly half as broad again as long, dorsal carina slightly concave in middle, lateral angle 90° , lateral carina somewhat curved, not reaching middle, its anterior portion being obsolete. Scutellum, in dorsal aspect, nearly semicircular, with a slight median depression.

Elytra cylindrical, twice as long as pronotum, subbasal callosities vestigial. Pygidium about as long as broad, rounded-triangular from lateral angles.

Prosternum densely punctate, punctures of posterior half large and close together, forming a regular net, below posterior angle a fairly large impunctate glossy space.

Metasternum and abdomen densely and rather minutely punctate, somewhat coriaceous, with interspersed large punctures. Anal sternite with a small, smooth, apical swelling.

9. *Melanopsacus minutus*, sp. n.

♂ ♀. Præcedenti similis, sed minutus, carina laterali brevior, elytris longioribus, scutello minuto, triangulari.
Long. 1.7 mm.

Hab. Sikkim: Gopaldhara, 3400–4700 feet, ix. 1914 (*H. Stevens*), a series, found in a dead tree-trunk and under bark.

Rufescent black-brown, legs and base of antenna rufous. Frons one-third narrower than space between antennal grooves, broader than in *M. anthracinus*. Lateral carina of prothorax scarcely longer than the oblique basal carinula. Scutellum at least as long as broad, triangular. Elytra more than twice as long as the pronotum.

10. *Melanopsacus gagates*, sp. n.

♂. Ater, antennis pedibusque brunnescentibus; fronte lata; articulo 2^o antennæ primo longitudine æquali, clava sat lata; angulo carinæ recto; abdomine medio late depresso.
Long. 2.8 mm.

Hab. Sikkim: Gopaldhara, viii. 1920 (*H. Stevens*), 1 ♂.

Cylindrical, a little over twice as long as broad. Frons nearly as wide as the space between the antennæ. Segment 2 of antenna as long as 1 and as 3 and 4 together, 9 and 10 triangular, somewhat rounded at apex, about twice as long as broad, 11 elliptical. Pronotum distinctly depressed along dorsal carina, which is almost straight, being but very feebly concave in middle, lateral angle 90°, with the tip rounded off, lateral carina short, a little shorter than the oblique carinula. Scutellum small, triangular, slightly broader than long.

Elytra twice as long as pronotum, half as long again as broad, subbasal callosities vestigial, an indication of a depression behind them. Pygidium about as broad as long, triangular from the lateral angles, apex rounded.

Prosternum densely punctate, somewhat rugate, a narrow glossy stripe from coxa upwards impunctate, between this stripe and basal margin the punctures large and not close

together, below carina a small impunctate uneven space. Metasternum with largish dispersed punctures. Abdomen broadly depressed in middle (♂) from base, except last segment, coriaceous, minutely punctate, with dispersed large punctures which are arranged in three rows on segments 1 to 3, the median row incomplete.

11. *Melanopsacus specialis*, sp. n.

♂. Niger, brunnescens, antennarum basi tarsorumque apice rufis; fronte postice angustata; antennarum articulo 2° primae longitudine subaequali; ultimo luteo-albo; angulo carinae recto; elytris pone basin sat perspicue gibbosis; pygidio late rotundato.

Long. 2.7 mm.

Hab. Travancore: Wallardi, ix. 1905 (*R.-P. Favre*), 1 ♂.

Frons about one-third narrower than interspace of antennae. Segment 2 of antenna nearly as long as 1, much shorter than 3 and 4 together, 8 almost as long as 3, club rather broad, 9 and 10 triangular, with the apical margin incurved, half as long again as broad, 11 irregularly ovate, broader than 10, only a little wider than long, very pale, probably white in live specimens.

Pronotum somewhat uneven, broadly flattened in middle before the carina, which is very slightly concave centrally, angle of carina 90°, tip rounded off, lateral carina not quite reaching to middle, its anterior portion obsolescent, angle of prothorax strongly produced downward, the carinula long.

Scutellum triangular, much broader than long. Elytra twice as long as pronotum, half as long again as broad, with distinct subbasal callosities, behind which there is a depression, at sides before middle another depression.

12. *Melanopsacus subfasciatus*, sp. n.

♂ ♀. Rufo-brunneus, antennis pedibusque pallidioribus, elongatus, pube aureo-grisea subfasciatus; fronte lata; angulo carinae recto; elytris pone basin sat perspicue callosis, sutura antice depressa.

Long. 2.2-3 mm.

Hab. Sikkim: Kurseong, a series, type; South India: Nilgiri Hills, 1 ♀.

The yellowish-grey pubescence forms on the upperside inconspicuous transverse bands, three on the pronotum

(apical, median, and basal) and four on the elytra (before, in and behind middle, and at apex), all ill-defined.

Eyes nearly as far apart as antennæ. Segment 2 of antenna almost as long as 1, a little shorter than 3 and 4 together, 8 slightly shorter than 3, club symmetrical, 9 and 10 triangular, with rounded sides, about half as long again as broad, 9 perceptibly narrower than 10 and 11, 11 elliptical.

Pronotum one-third broader than long, faintly uneven, rather strongly depressed along carina, which is concave in middle, lateral angle of carina 90° , with the tip rounded off, sometimes slightly obtuse, lateral carina short, reaching about halfway to middle, basal angle of prothorax short.

Scutellum triangular, about as long as broad. Elytra half as long again as broad, cylindrical, subbasal callosities rather distinct, the bases of the suture and elytra being depressed, shoulders swollen. Pygidium triangular from lateral angles, apex more strongly rounded in ♂ than in ♀. From fore coxa upwards a rather broad impunctate stripe, at basal lateral angle of prosternum a small, uneven, impunctate space. Metasternum with dispersed large punctures, which are more numerous laterally. Abdomen densely punctulate, with a few large punctures at the bases of the proximal segments; middle of abdomen depressed in ♂. Hind femur reaching to base of last segment.

13. *Melanopsacus difficilis*, sp. n.

♂ ♀. Speciei *M. subglaber*, Jord. (1895), dictæ similis, brevior, latior, angulo carinæ subacuto.
Long. 1·8–2·2 mm.

Hab. Queensland (type) and Sumatra, a small series.

Less elongate than *M. subglaber*, Jord. (1895), long ovate, the prothorax particularly shorter.

Eyes half as widely apart as antennæ. Pronotum one-third broader than long, widest at base, almost gradually narrowed to apex, dorsal carina slightly concave in middle, angle of carina perceptibly smaller than 90° , both the dorsal and lateral carina curved in the direction of the carinula without forming distinct angles with it. Elytra less cylindrical than in *M. subglaber*. Apical margin of pygidium of ♂ much less elevate, not tuberculiform.

The stripe which runs from fore coxa dorsad and is placed behind the middle in *M. subglaber* is median or antemedian

in *M. difficilis*; below carina an impunctate glossy space as in *M. subglaber*.

14. *Melanopsacus gravatus*, sp. n.

♀. Statura præcedentis, pygidio sat fortiter convexo, segmento ventrali anali margine apicali in medio dente supra concavo instructo distinguendus.

Long. 2 mm.

Hab. Philippines: Pt. Bango, Mindanao, several ♀ ♀.

As broad as the previous species, with the same proportions. Club of antenna asymmetrical as in *M. subglaber*. Angle of carina 90°, with the tip rounded off; dorsal carina very slightly incurved in middle. Pygidium broader than in *M. difficilis* and *M. subglaber*, conspicuously convex.

On underside of prothorax a stripe from coxa upwards and a large area below carina impunctate, glossy. Anal sternite, instead of having a minute median sinus, is medianly produced into a small triangular projection, which is concave on the upperside, resembling the spout of a jug.

15. *Melanopsacus vestitus*, sp. n.

♂ ♀. Statura et indumento *M. ceylonico*, Jord. (1895), similis. Elongato-ovatus, brunneus, pube aureo-sericea maculatim disposita vestitus. Caput cum pronoto densissime grosse punctato-reticulatum, angulo carinæ acuto. Segmenta abdominalia duabus seriobus punctorum grossorum transversis instructo, primum (♂) medio convexum.

Long. 2-2.4 mm.

Hab. Philippines: Mt. Bonahso, Luzon, 3 ♂ ♂, 1 ♀.

Eyes one-fourth nearer together than antennæ. Segment 2 of the latter shorter than 1, 8 as long as 3, club symmetrical, 9 and 10 triangular, with the sides rounded, twice as long as broad, 11 elongate-elliptical. Pronotum widest at base, less than half as broad again as long, surface-structure coarse; dorsal carina very feebly concave medianly, convex laterally, lateral angle of carina acute, but not much produced on to the basal lobe of the prothorax, lateral carina curved. Scutellum small, triangular.

Elytra not quite twice as long as pronotum, almost evenly convex, suture not depressed at base, subbasal callosities quite indistinct, stripes deep. Pygidium a little broader than long, convex, apex strongly rounded.

Prosternum with impunctate stripe from coxa upwards,

behind this stripe four rows of large punctures, below carina an impunctate space, punctures on anterior half of prosternum large, not very close together. Punctures of metasternum dispersed. Abdomen almost smooth, segments 1 to 4 with two transverse rows of large punctures, the rows more or less irregular on 3 and 4, segment 5 and middle of 1 convex in ♂. Hind femur reaching to apex of abdomen.

16. *Melanopsacus pusillus*, sp. n.

♂ ♀. Parvus, cylindricus, prothorace sine carina laterali, oculis multo magis quam antennis approximatis.

Long. 1·7–2·3 mm.

Hab. Perak (*W. Doherty*), a small series.

Rufescent black, antennæ and legs rufous-brown, base of antennæ, fore tibia and fore tarsus, and the apices of the mid and hind tarsi paler.

Eyes barely half as far apart as the antennæ. Length of rostrum (measured from tubercle of antennal groove) equals the diameter of the interspace of the antennæ, apical margin depressed in middle, faintly incurved, outer margin of mandible almost evenly arched. Segment 2 of antenna nearly as long as 1, club long, narrower, 9 and 10 asymmetrical.

Prothorax almost evenly narrowing from base to apex, dorsal carina perceptibly concave in middle, gradually curving backwards at the sides, the oblique lateral basal carinula appearing as a prolongation of the dorsal carinæ; lateral carina obsolete.

Elytra nearly twice as long as pronotum, half as long again as broad, subbasal callosities vestigial, base depressed along raised margin, stripes regular. Pygidium triangular from the lateral angles, as long as broad.

Prosternum with impunctate space at posterior angles; the boundary between the pronotum and the concave posterior portion of the sternum rather strongly curved in a dorsal aspect. Abdomen with large punctures arranged in three transverse rows on segments 1 to 4, the middle row not reaching the sides.

17. *Melanopsacus nanus*, sp. n.

♂. Speciei præcedenti persimilis, magis elongatus, carina prothoracis ad latera paululo antrorsum flexa, pygidio latiore.

Hab. Perak (*W. Doherty*), 2 ♂ ♂.

Dorsal carina of pronotum evenly convex, not concave in middle, laterally not completely merging into the basal oblique carinula, but slightly curved forward and forming an angle with the carinula, sides of prothorax less incurved in front of base than in *M. pusillus*, the boundary between pronotum and concave underside almost straight.

Elytra twice as long as pronotum, being longer than in *M. pusillus*. Pygidium larger, much more strongly rounded, broader than long.

18. *Melanopsacus veitchi*, sp. n.

♂. Niger, antennis pedibusque rufis, elytris macula communi aurea conspicua antemediana quadriloba ornatis; fronte capitis lata; angulo carinae acuto; pygidio dimidio apicali impunctato nitido.

Long. 2.5 mm.

Hab. Fiji: Nausore, v. 1921 (*R. Veitch*), 1 ♂.

Easily recognized by the conspicuous golden mark on the elytra.

Elongate-ovate. Base and club of antenna, as well as the tarsi, pale rufo-testaceous. Eyes as widely apart as the antennae. Segment 2 of antenna shorter than 1, club two-thirds the length of 3 to 8 together, symmetrical, 9 and 10 triangular, twice as long as broad, 11 elliptical, 9 a very little longer than 10. Prothorax barely one-third broader than long, broadest at base, rounded in middle and thence strongly narrowing to apex, dorsal carina slightly concave in middle, convex laterally, lateral angle acute, lateral carina extending to middle, curved. Scutellum minute.

Elytra two-thirds longer than pronotum, coarsely striate-punctate, with distinct subbasal and humeral callosities, the base of the suture depressed; the antemedian golden spot composed of a line in interspace 2 and another, somewhat longer and farther back, in 3, the two short lines so connected by a transverse bar across second row of punctures that the anterior end of the second line and the posterior end of the first line project, the anterior line also connected with the anterior line of the other elytrum, the frontal ends projecting, the spot thus formed recalls a certain coat of arms; behind the middle of each elytrum an indistinct greyish dorsal patch, which is perhaps more distinct in other specimens. Pygidium triangular, apex

rounded, basal half with large punctures, apical half smooth, slightly uneven, glossy.

Prosternum grossly punctate-reticulate in anterior half, an impunctate stripe from coxa upwards, broadish near coxa, then very narrow, between this stripe and basal margin about seven irregular rows of large punctures, at basal angle a small, impunctate, somewhat uneven space. Metasternum with dispersed large punctures. Abdomen minutely punctate, segments 1 and 2 with a basal row of large punctures, 3 with a basal row and an apical one, 4 and 5 and the impressed middle of 1 to 4 with more numerous punctures, apex of 5 convex.

19. *Melanopsacus latifrons*, sp. n.

♀. Niger, parum rufescens, antennarum basi tarsorumque apice rufis; fronte latissima, antennis magis quam oculis approximatis; carina dorsali prothoracis in medio angulata, angulo laterali acuto, carina laterali brevi obsolacente; elytris inæqualibus, ante et post medium atque ante apicem declivem transversim impressis.

Long. 3 mm.

Hab. Bolivia: Cochabamba (*Germain*), 1 ♀.

Eyes farther apart than the antennæ. Upper edge of antennal groove above middle of eye. Segment 2 of antenna as long as 1, longer than 3 and 4 together, 5 longer than 3, 8 a little shorter than 9 is broad, club rather short, not much flattened, 9 and 10 conical, with the sides convex, 10 a little shorter than 9, less than half as long again as broad, 11 elliptical, pedicels of all three segments of club short.

Pronotum half as broad again as long, rather strongly narrowing forward, convex in centre, somewhat depressed transversely in front of centre and along carina, meshes of reticulation larger in subapical depression and at sides than before carina, which is angulate in middle, lateral angle acute, but not produced downward, basal angle of prothorax and its carinula short, lateral carina rather shorter than carinula. Scutellum transverse, somewhat projecting upward.

Subbasal callosities of elytra prominent, suture depressed between them, behind them a conspicuous transverse impression, behind middle and before apical declivity two more impressions, sixth interspace depressed, particularly before and behind middle, a further impression before

middle at side, before apical margin a transverse depression, interspace 4 narrower than 3. Pygidium a little broader than long (measured from the most basal point of the elevate basal margin), triangular from the lateral angles, apex rounded off.

Prosternum densely punctate-reticulate, at basal lateral angle an impunctate space. Metasternum with dispersed punctures, which are more numerous anteriorly and at side. Abdomen very densely punctate, somewhat rugulose.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

March 12th, 1924.—Prof. W. W. Watts, Sc.D., F.R.S.,
Vice-President, in the Chair.

The following communication was read:—

‘Descriptions of Gasteropoda, chiefly in the late Mrs. Robert Gray’s Collection, from the Ordovician and Lower Silurian of Girvan.’ By Jane Longstaff (*née* Donald), F.L.S., F.G.S.

Since this paper deals especially with some of the gasteropoda contained in the magnificent collection of the late Mrs. Robert Gray, others are only mentioned where they afford further information concerning structure or distribution. Forty-one forms are dealt with, of which one has been named in manuscript, and seven have been described by previous authors.

By far the greater number: namely, twenty-five species and one variety, belong to the Pleurotomariidae; of these twenty-one are new to science, and for two of the species a new subgenus is suggested.

The absence of the genus *Raphistoma* Hall is remarked on, and three species previously placed in it are transferred to *Liospira* Ulrich, as the possession of a sinual band distinguishes them from members of the former. A new species is also referred here.

Besides these Pleurotomarians, four new species belonging to three subgenera of the Loxonematidae are described; two of the latter are new to science.

Also two species of the genus *Maclurea* are described, one new; four of *Eccyliomphalus*, two new; two of *Lesucurilla*, both new; one of *Euomphalopterus*, previously undescribed; and two of *Clisospira*, which are not only species new to science, but the genus itself does not appear to have been recorded before from the British Isles. One of these is sufficiently well preserved to give evidence of the peculiar characteristics of the sutural divisions.

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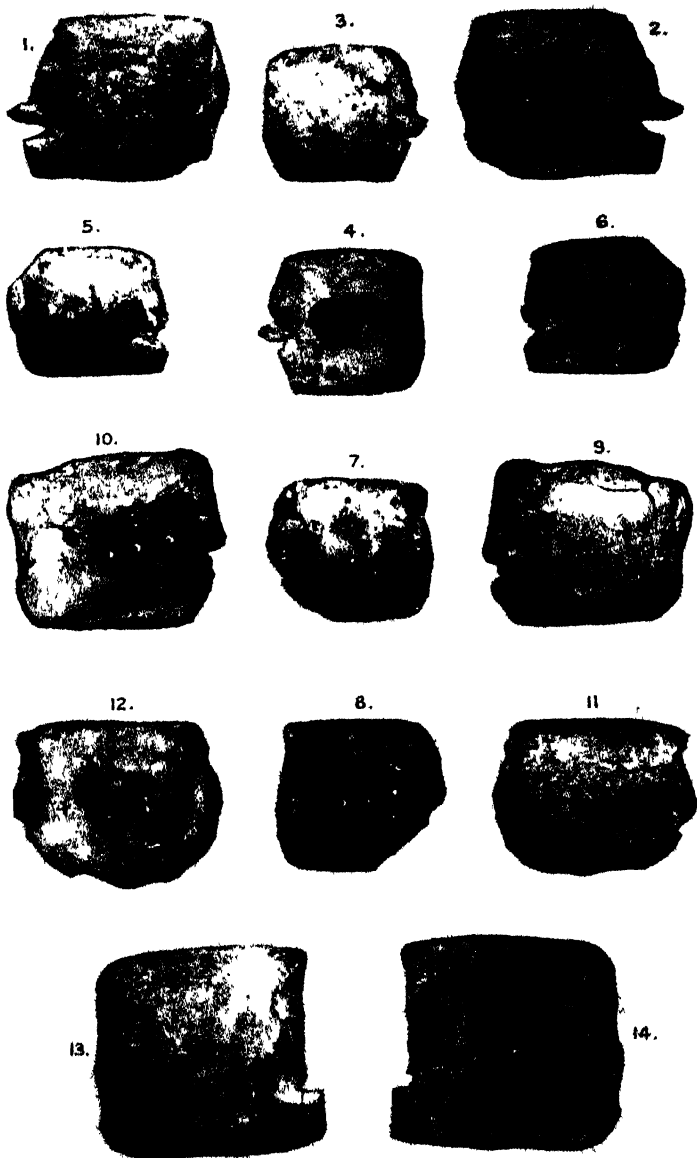
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END OF THE THIRTEENTH VOLUME.

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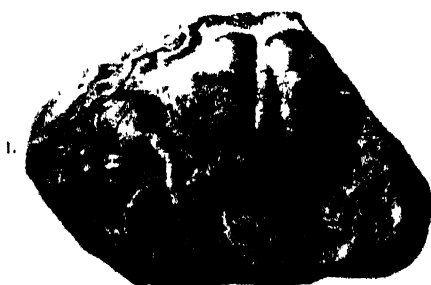


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JAMAICAN TERTIARY DECAPODS.



1 G. Herring, photo

JAMAICAN TERTIARY DECAPODS.



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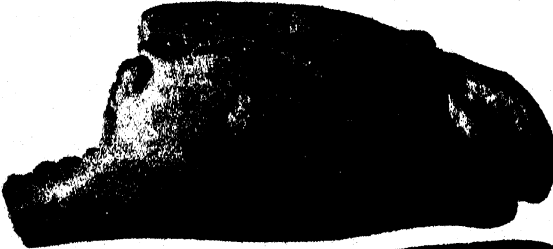
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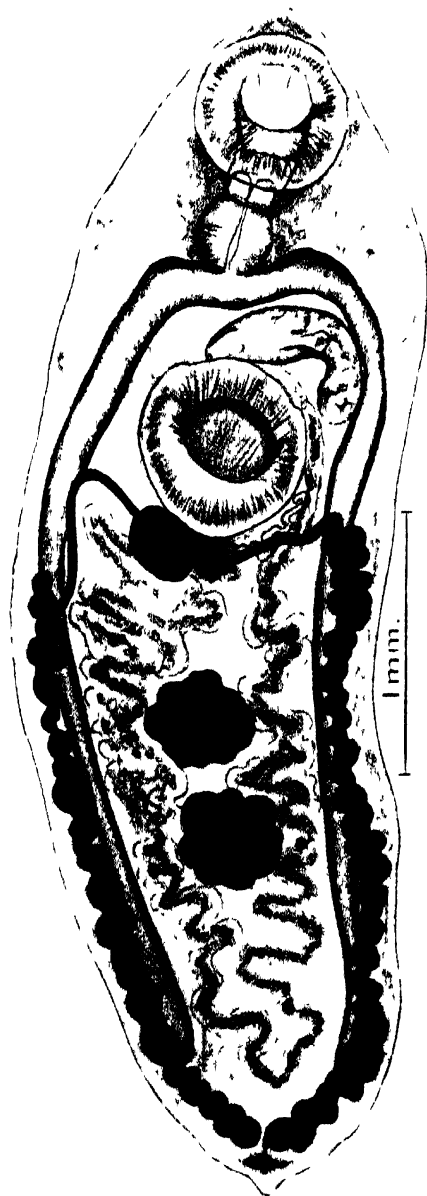
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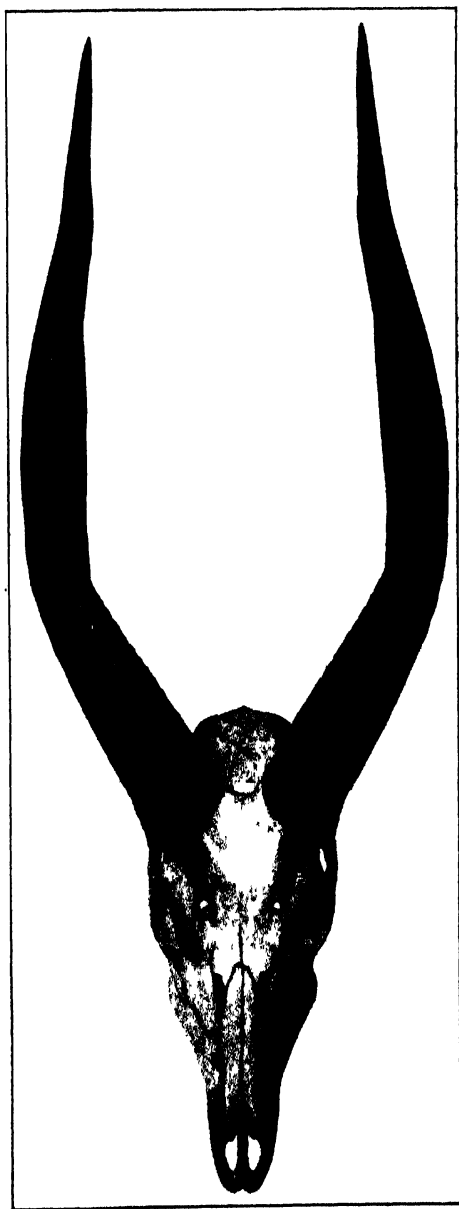
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H. G. C. del.

Encyclometra natricis, gen. et sp. n.



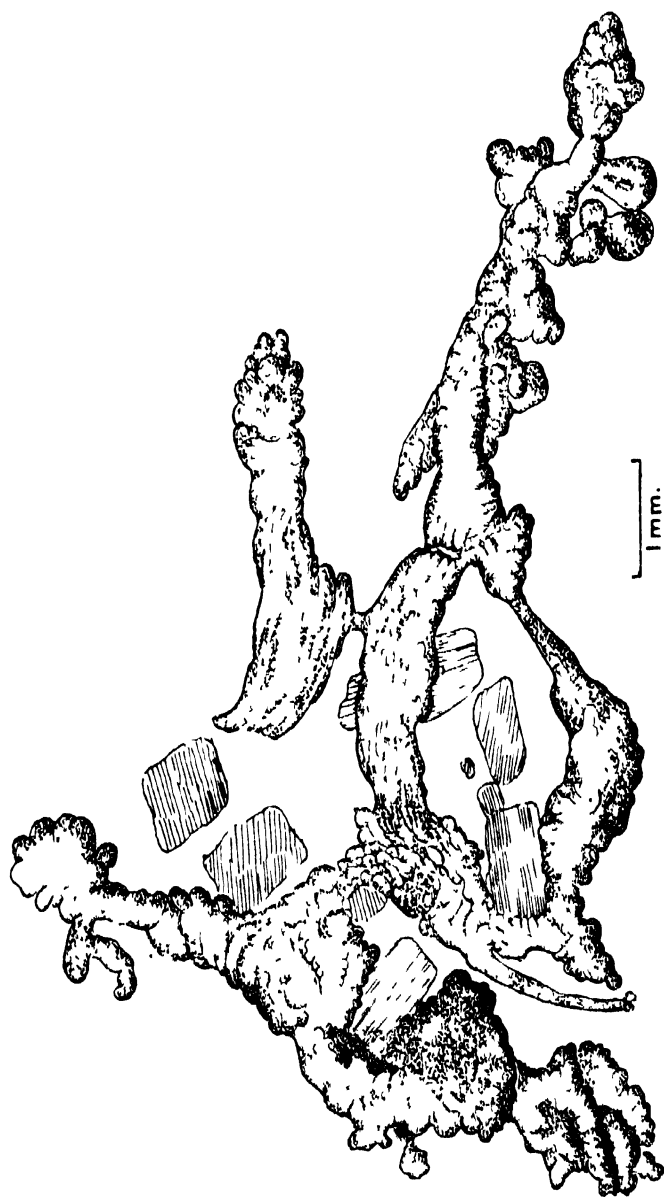
Skull of *Linnotragus spekei wilhelmi*, subsp. n.



Fragments of Holothurian.



Branching Form of Tissue of *Balanoglossus*.



Reticulate Form of Tissue of *Balanoglossus* sand-grains represented by line-shading

